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ABSTRACT

This report details the development and implementation of a Tennessee Valley Authority-funded demonstration environmental education project and the utilization of a mobile laboratory for conducting studies. Instructional materials were developed that are interdisciplinary in nature and activity oriented in approach. A discussion of the design and equipment for the mobile unit is included. Uses in inservice training and an evaluation of the first year's operations are presented. Related documents are ED 073 922 and ED 073 923. (LS)

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MOBILE ENVIRONMENTAL EDUCATION LABORATORY PROJECT FINAL REPORT

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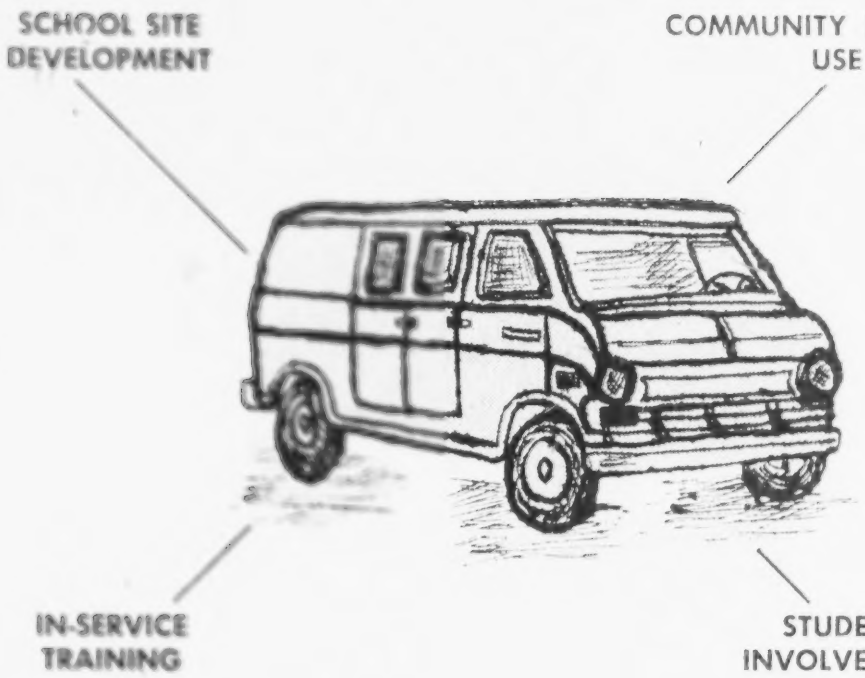

Environmental Education Demonstration Project

Tennessee Valley Authority - Kingsport City Schools

May 15, 1972 - June 15, 1973

SE 016 928

ED 086494

FINAL PROJECT REPORT
T.V.A. DEMONSTRATION PROJECT
MOBILE ENVIRONMENTAL EDUCATION LABORATORY
KINGSPORT CITY SCHOOLS
KINGSPORT, TENNESSEE
(May 15, 1972 through June 15, 1973)

Ralph E. Evans

Ralph E. Evans, Superintendent of Schools

Ronald B. Childress

Ronald B. Childress, Project Director

MOBILE ENVIRONMENTAL EDUCATION LABORATORY PROJECT

KINGSPORT CITY SCHOOLS
Kingsport, Tennessee 37664
(May, 1972 - June, 1973)

Superintendent of Schools
Dr. Ralph E. Evans

Project Director
Ronald B. Childress

Project Consultant
Jonathan Wert
Environmental Education Specialist
Tennessee Valley Authority

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The Kingsport City School System is indebted to the following people for their assistance and interest in planning, developing and implementing the mobile environmental education laboratory project:

Consultants

Mr. Charles D. Carpenter
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Dr. Dean Bennett
Project Director
Maine Environmental Education Project
Yarmouth, Maine 04096

Mr. Terry McCormick
Science Coordinator
Johnson City Schools
Binghamton, New York 13903

Mr. H. C. Green
District Conservationist
Sullivan County
Soil Conservation Service
Blountville, Tennessee 37617

Mr. Jonathan Wert
Environmental Education Specialist
Tennessee Valley Authority
Knoxville, Tennessee 37902

Workshop Participants

Mr. Dalton Bloomer
Social Studies Teacher
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Mr. Don Little
Science Teacher
Ross N. Robinson Junior High School
Kingsport, Tennessee 37660

Mr. David Ingram
Science Department Chairman
Dobyns-Bennett High School
Kingsport, Tennessee 37664

Mrs. Anna Dickison
Classroom Teacher
Lincoln Elementary School
Kingsport, Tennessee 37664

Mrs. Louise Hensley
Classroom Teacher
Johnson Elementary School
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Our gratitude is also expressed to Mrs. Grace Jones and Mrs. Alice Helton for clerical assistance, to Mrs. Betty Hyder and Mrs. Ruth Anderson for artistic contributions to this project, and to Keith Oaks and Steven Hutton, Mechanical Drawing students at Dobyns-Bennett High School, for preparing the mobile unit design drawings.

A special note of thanks is expressed to the Tennessee Valley Authority for financial and technical assistance, and especially to Mr. Jonathan Wert, T.V.A.'s Environmental Education Specialist, for his interest, assistance, and expertise provided throughout the project.

Ronald B. Childress
Project Director

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INTRODUCTION

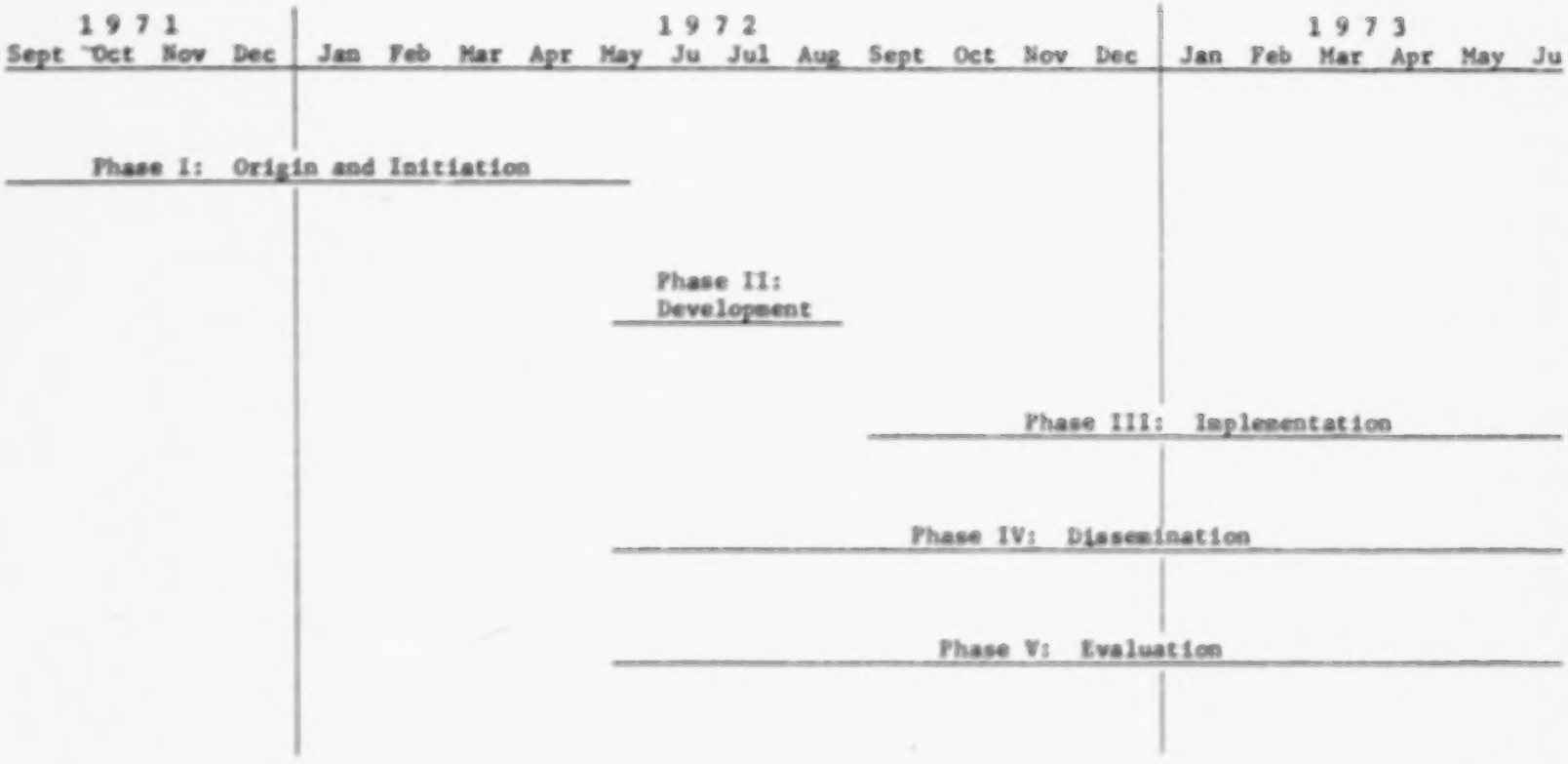
In May, 1972, the Kingsport City School System received financial assistance from the Tennessee Valley Authority to plan, develop, and implement, as a demonstration environmental education project, the utilization of a mobile laboratory for conducting environmental studies.

The total planning, development, and implementation of the project can be viewed in terms of five distinct, yet interrelated phases. They are as follows:

Phase One - Project Origin and Initiation
Phase Two - Project Development
Phase Three - Project Implementation
Phase Four - Project Dissemination
Phase Five - Project Evaluation

Except in the event of minor deviations, this final project report will adhere to this sequence of phases in summarizing and evaluating the total project.

MOBILE ENVIRONMENTAL EDUCATION LABORATORY PROJECT
PROJECT TIMETABLE



PHASE ONE
PROJECT ORIGIN AND INITIATION

INTRODUCTION

The Kingsport City School System has been actively involved in the planning and development of a total environmental education program, kindergarten through grade twelve, for three years. Based on the belief that environmental education must become a priority and that the educational system has a key role to play in producing citizens who can make intelligent decisions about resource use and environmental quality, the program was initiated in 1970 by the hiring of an environmental education coordinator for the system. The following section provides a description of program development as it existed prior to the addition of the mobile environmental education laboratory.

EXISTING PROGRAM DESCRIPTION

Centered around environmental problems and the wise use of resources, the environmental education program in the Kingsport City School System is interdisciplinary, activity focused, involvement oriented, and directed toward making education more relevant to the real life experiences of students.

The total program is founded on the realization that there is a definite need for learning experiences which help students become:

a. Aware of their natural and man-made environment and the related problems.

b. Knowledgeable and accurately informed about the total environment and the related problems.

c. Motivated to find alternatives or solutions to these problems.

d. Committed to and involved in some type of constructive action to remedy these problems.

Beginning in 1970 with a nature study program for fourth, fifth, and sixth grade students and the employment of a full-time coordinator, the program has since grown into a total environmental education program spanning all grade levels.

The total program consists of three interrelated phases:

a. Day-use of community resource facilities.

b. Development and utilization of environmental study areas on school sites.

c. Participation in a residence environmental education program.

All phases of the program are preceded and followed by related classroom instructional activities and projects.

Community Resource Use

Within every community there are facilities, either natural or man-made, which may be utilized in an environmental education program. Likewise, most communities have persons with expertise in related areas of environmental study. These community resource consultants are valuable additions to a total environmental education program.

To identify available facilities and consultants, a teacher in-service committee was formed. Meeting periodically through the 1970-71 school year, these teachers surveyed their school communities and respective faculties. As a result, a composite list of available community resource facilities and consultants was compiled and distributed to each teacher. Examples of community resources utilized range from sewage treatment plants and vacant lots in the urban environment to natural or wilderness areas in the rural environment. Examples of community resource consultants utilized include industrial pollution control experts, local historians, and amateur naturalists, to name only a few. (A copy of this composite list is included in the appendix.)

Residence Program

Realizing the significance of a residence experience as a part of a total environmental education program, interested third, fourth, fifth, and sixth grade classes participate in the Maryville College Environmental Education Program at Tremont. The Tremont Center, an abandoned Job Corp facility, is located near Gatlinburg, Tennessee, in the Great Smoky Mountain National Park.

The Maryville College Program is a week-long residence experience jointly sponsored by the National Park Service and Maryville College. The main emphasis of the program is the implementation of the National Park Service's NEED (National Environmental Educational Development) Program. The NEED Program emphasizes that environmental education is not just nature study or outdoor education and that the total curriculum including art, mathematics, history, and language arts relate to the environment.

Environmental Study Areas

Environmental education implies taking advantage of the total environment for conducting environmental studies. As a segment of the total environment, the school campus offers many unique opportunities for conducting environmental studies. Using technical assistance provided by the Soil Conservation Service and the Tennessee Valley Authority, plans for developing environmental study areas on all elementary school campuses in the Kingsport system have been prepared. Included in these plans are outdoor classrooms, interpretative trails (where applicable), environmental monitoring stations, and wildlife food plots to name a few. The majority of development is being carried out by students, parents and teachers. Interpretative guides and work sheets have been developed for use with these areas. It is expected to take three years for complete development of these study areas.

Environmental education in Kingsport is an integral part of the total school curriculum. Activities conducted outside the classroom are an extension of the in-school program. All studies out of school are closely related to the in-school curriculum. Through this approach, it is believed the student will become acquainted with his total environment and aware of the impact that he, as an individual and man collectively, has on future environmental quality.

IDENTIFICATION OF NEEDS

Throughout the 1971-72 school year, administrators, teachers, representatives from resource agencies, and the program coordinator discussed and analyzed the existing environmental education program in the Kingsport City School System.

Resulting from this assessment of the existing program was the identification of four needs. There were as follows:

a. Traditionally, teacher training institutions have failed to prepare elementary and secondary teachers in the methods and techniques necessary to conduct environmental investigations. As a result, there was a definite need for in-service training sessions relating to environmental studies.

b. A shortage of instructional materials designed for use with community resources curtailed the use of many valuable resource facilities.

c. A lack of the necessary equipment and materials for conducting environmental investigations placed limitations on the types of activities that could be carried on.

d. The inconvenience, loss of time, and expense involved in providing transportation to community resource facilities distant from the school constituted a major logistical problem for teachers.

PROJECT PROPOSAL

Following program assessment and the identification of needs, efforts were begun to determine the best method of meeting these needs.

Having heard of the mobile unit approach being planned by T.V.A. for the Norris Dam Reservation, it was felt that the feasibility of such a project should be investigated. Resulting from this investigation was the realization that the mobile unit approach would meet the identified needs in the following ways:

a. Lack of teacher training: The mobile environmental education laboratory would serve as a basic resource for conducting teacher workshops and in-service training sessions in environmental study areas at each school as well as on-site at selected community resource facilities.

b. Shortage of instructional materials: Instructional materials, for students and teachers, designed for use with the mobile unit and focused on community resources would be developed as a major component of the total project.

c. Lack of materials and equipment: The mobile unit and included equipment would provide the resources necessary for conducting environmental studies.

d. Transportation to and from resource facilities: Through the utilization of the mobile unit, included equipment, and community focused instructional activities, many activities previously requiring transportation could be conducted on-site at the school or at community resource facilities within walking distance.

With the needs identified and the feasibility of the mobile unit approach established, a formal proposal requesting funding in the amount of $19,500 was submitted to T.V.A. (Copies of the proposal and contract are included in the appendix.) The overall goal of this project was for the Kingsport City School System to plan, develop, and implement, as a demonstration environmental education project, the utilization of a mobile laboratory for conducting environmental studies. Primary objective of the project was to demonstrate and verify a new concept in environmental education by:

a. providing in-service training to elementary (including preschool), secondary, and postsecondary education personnel to enable them to participate effectively in environmental education programs;

b. developing materials designed to assist the introduction of environmental studies in existing programs and/or strengthen the content of existing environmental programs at all educational levels;

c. developing curricula which will provide useful learning experiences leading to an understanding of environmental principles, problems and their causes, and possible solutions to those problems.

SUMMARY

With the receipt of funding on May 15, 1972, Phase One of the mobile environmental education laboratory project was completed. The remainder of the project period (the official funding period) would deal with actual development, implementation and evaluation.

PHASE TWO
PROJECT DEVELOPMENT

INTRODUCTION

The second phase of the project, actual development of the mobile unit and curricular materials and the selection of equipment for the mobile unit, immediately followed Phase One. This phase of the project began officially on May 15, 1972, and was completed in early fall when implementation was initiated.

DEVELOPMENT OF INSTRUCTIONAL MATERIALS

As identified in the program needs assessment, there was a definite need for instructional materials to be utilized with community resource facilities. As a result, an important segment of total project development was the development of instructional materials for use with students and in in-service training for teachers.

Integrating all curriculum areas and utilizing the mobile unit as the primary resource facility, these materials include man's relationship with the natural and man-made environments including the relation of population pressures, pollution, resource allocation and depletion, conservation, technology, and urban and rural planning to the total human environment. Economic, social and political aspects of environmental deterioration will be included where relevant.

Summer Workshop

Instructional materials were developed in a Curriculum Development Workshop held June-August, 1972. Participants in the workshop included the Project Director, five teachers, and a clerk. Teachers included one from

the senior high level, two from the junior high level and two from the elementary level. Following is a list of these participants:

Mr. Dalton Bloomer
Social Studies Teacher
John Sevier Junior High School
Kingsport, Tennessee 37660

Mr. Don Little
Science Teacher
Ross N. Robinson Junior High School
Kingsport, Tennessee 37660

Mr. David Ingram
Science Department Chairman
Dobyns-Bennett High School
Kingsport, Tennessee 37664

Mrs. Anna Dickison
Classroom Teacher
Lincoln Elementary School
Kingsport, Tennessee 37664

Mrs. Louise Hensley
Classroom Teacher
Johnson Elementary School
Kingsport, Tennessee 37664

Mrs. Alice Helton
Secretary
John Sevier Junior High School
Kingsport, Tennessee 37660

Mr. Ronald B. Childress
Project Director
Kingsport City Schools
1701 E. Center Street
Kingsport, Tennessee 37664

The following criteria were used as a basis for selecting these people as workshop participants:

a. Interest

b. Previous involvement in environmental education activities

c. Principal and Superintendent recommendations

d. Background and training

e. Ability to work cooperatively and effectively within a small group

f. Leadership ability

Consultants

Consultant expertise was utilized throughout the development of the instructional materials. The consultants and their contributions to the workshop and total project development were:

Mr. Charles D. Carpenter, Director
Mobile Science Laboratory
Science District No. 241
Albert Lea, Minnesota 56007

Mr. Carpenter has directed a federally funded Mobile Science Laboratory since 1965. As a result he offered many practical suggestions on mobile unit design and use. Having also worked with the Minnesota Department of Education in developing environmental education in-service programs, Mr. Carpenter was very helpful in development of the in-service instructional materials.

Dr. Dean Bennett
Project Director
Maine Environmental Education Project
Yarmouth, Maine 04096

Dr. Bennett, who possesses a doctorate in environmental education from the University of Michigan, is director of the Maine Environmental Education Project. Being actively involved in environmental studies on school sites, Dr. Bennett was very helpful in suggesting ways of relating the mobile unit to school site use. His expertise was also very helpful in designing the format for the instructional activities.

Mr. Terry McCormick
Science Coordinator
Johnson City Schools
Binghamton, New York 13903

Mr. McCormick, science coordinator for the Johnson City Schools, has been actively involved in outdoor education for several years. Having operated a mobile unit as part of an outdoor education program he had many helpful suggestions relating to the types and content of activities and how these could be implemented.

Mr. H. C. Green
District Conservationist
Sullivan County
Soil Conservation Service
Blountville, Tennessee 37617

Mr. Green, a long-time resident of the immediate area, provided technical assistance and materials as they related to land use, land planning and basic natural resources. Mr. Green has continued to provide this assistance throughout the project.

Mr. Jonathan Wert
Environmental Education Specialist
Tennessee Valley Authority
Knoxville, Tennessee 37902

Throughout the workshop, as well as the total project period, Mr. Wert's interest, assistance, and expertise have been an integral part of the total project development.

Copies of the workshop schedule and outline are included in the appendix.

Instructional Materials

Resulting from this workshop was a series of 44 student and three teacher in-service environmental education instructional activities. These activities were combined into a publication entitled Investigations For A Mobile Environmental Education Laboratory.

Individual activities are involvement oriented and are designed around the following sequence of steps:

a. The student investigates some aspect of his total environment.

b. As a part of this investigation, the student collects some type of data.

c. Based on the investigation and the data collected, the student evaluates to determine if a problem exists.

d. If a problem is identified, the student recommends remedial or constructive actions.

e. The student becomes involved in these remedial or constructive actions.

Throughout this entire process the interrelationships and interdependences that exist between the natural and man-made environments, and the total effect of man are emphasized.

Workshop Evaluation

Because of this unusual project approach in which instructional materials for utilizing the mobile unit were developed by teachers, for teachers, the workshop participants were asked to evaluate the workshop and its resulting implications. Following is a summary of the evaluation results: (A copy of the evaluation instrument is included in the appendix.)

a. Workshop participants felt environmental education activities resulting from the workshop could be easily integrated into the individual classroom because they related all curriculum areas, followed general school system guidelines, extended the classroom to the immediate community, and most importantly, they were developed by practicing teachers from within the system.

b. Participants felt there was a definite need for a follow-up workshop to evaluate and revise the initial activities developed. This follow-up workshop could also be used to add to and expand the activities.

c. Strong points listed for this workshop were freedom in selecting activities, the use of consultant expertise, the availability of a variety of materials, workshop coordination and leadership, the opportunity to work with fellow teachers from varied grade levels and subject areas, the excellent physical facilities, and the use of a guiding format and philosophy throughout development.

d. Recommendations made for workshop improvement included the use of more teachers, a time period within the project to field test the materials being developed, and the scheduling of the consultants during the early part of the workshop. (Director's Note: Many times the schedules of the available qualified consultants will conflict, making this difficult.)

e. Participants felt that the use of consultant expertise was an extremely valuable component of the workshop. Aside from their expertise, the materials and ideas from their own programs are very helpful. It was felt that in selecting consultants, care should be taken to select people who are or have been practicing classroom teachers.

f. Workshop participants felt their primary roles in project implementation were to serve as resource people for other teachers and administrators and to act as primary agents of implementation with students.

In summary, workshop participants are in total agreement that this approach to the development of instructional materials is valid and worthwhile. In addition to the development of the materials all participants felt that their knowledge of environmental education was expanded and increased.

MOBILE UNIT DESIGN

The primary resource for the entire project is a one-half ton, 1972, Ford Econoline van which has been designed and equipped for conducting environmental studies.

The interior of the unit has been especially designed for the storage of environmentally related equipment. (See scale drawings in

information brochure in appendix.) The top side of the unit has been equipped with a large metal storage compartment with three lift-up, metal water-tight doors. Additionally, a roll-out canvas canopy is attached to the curbside for protection of equipment and students during periods of inclement weather. (See information brochure.)

Safety Inspection

Following the recommendations submitted by Mr. Robert N. Pollard, T.V.A.'s Hazard Control Specialist, the following safety modifications have been made to the mobile unit:

a. A metal chain link protective screen, with sliding door, has been installed between the driver's seat and the storage area.

b. An approved fire extinguisher was mounted for easy access beneath the driver's seat.

c. The mobile unit was taken to an authorized automotive dealer for inspection and recommendations concerning load capacity. It was recommended that additional leaves be added to the rear springs. This has been completed.

d. A tubular aluminum ladder, for top access, has been added to the left rear door.

Mobile Unit Modification

Throughout the entire project period, the mobile unit design has been evaluated as to its feasibility through day-to-day use. As a result of this continuous evaluation process, the following minor modifications were made:

a. Originally, a large sheet of canvas served the dual purpose of top storage compartment cover and a canopy that could be erected to protect equipment during periods of inclement weather. Due to the inconvenience involved in removing and replacing this canopy/cover, the canvas was removed, reduced in size and mounted in a roll on curbside of the top storage compartment. In this position the canvas continues to serve as a pull-out canopy in the event of inclement weather.

b. To replace the canvas as a cover for the top storage compartment, three aluminum hinged covers were added. These covers are water-tight and hinged on the curbside of the van.

Recommendations

Based on the development and use of the mobile unit throughout the project period, the following recommendations are made as they relate to mobile unit design and possible future similar projects:

a. If available, a longer and wider wheel base van be used.

b. The curbside of the van be equipped with regular pull-out doors instead of the sliding door.

c. The unit be equipped with a four-speed, heavy-duty transmission.

d. The unit be equipped with oversized wheels and tires.

e. If available, a unit allowing standing room be utilized.

MATERIALS AND EQUIPMENT SELECTION

Selection Criteria

In selecting materials and equipment for inclusion in the mobile unit, the following factors were considered:

a. Relevance to environmental study with the mobile unit

b. Cost

c. Durability

d. Applicability to varied grade levels

e. Maneuverability and portability

f. Suitability for use in the field

g. Consumability

h. Applicability for group use

Materials and Equipment Selected

Equipment and materials included with the mobile unit are divided into six categories:

a. Tools and Related Equipment

Tape--Rule (10' and 100')
Mattocks
Budding and Grafting Knife
Pruning Shears
Field Trowels
Collecting Spades
Collecting Tools

b. Miscellaneous and Special Equipment

Tape Recorder
Camera
Film
Folding Tables, Aluminum
Metal Easel
Chalk, Assorted Colors
Clip Boards
Slide Projector

c. Laboratory Apparatus

Microscopes
Microscope Slides
Slide Cover Slips, Acetate and Glass
Stop Watch
Cotton Twine
Rope
Laboratory Aprons
Finger Bowls
Plastic Dishes
Dispensing Carbow
Beakers, Polyethylene
Meter Sticks
Funnels, Polyethylene
Pipettes, Polyethylene
Test Tubes
Medicine Droppers
Test Tube Rack
Plastic Trays
Triple-Beam Balance
Ph Paper
Stoppers, Assorted Rubber
Storage Bottles, Polyethylene
Fire Extinguisher

d. Environmentally and Ecologically Related Equipment

Insect Pins
Insect Killing Bottle
Air Pollution Tester
Canvas Side Sacks
Stream Thermometers
Dissecting Pins
Polyethylene Pails
Soil Thermometers
Limnological Testing Equipment (Natural Systems)
Pocket Field Magnifiers
Soil Testing Equipment
Animal Traps (Various Sizes)
Insect Nets
Insect Spreading Boards
Water Pollution Detection Kit
Water Sampling Bottle
Sounding Lead and Calibrated Line
Bottom Sampling Dredge
Secchi Disk
Plankton Net
Forel-Ule Color Scale
Water Testing Thermometers
Binoculars
Berlese Apparatus
Magnetic Compass
Collecting Jars, Polyethylene
Animal Cages (Various Sizes)
Dissecting Sets
Geology Picks
Soil Auger
Plant Press
Ecology Collecting Sack
Vasculum
Ringleman Charts
Increment Borer
Biltmore Cruiser Sticks
Tree and Log Scales
Noise Detection Equipment

e. Reagents

Ethyl-Alcohol
Formaldehyde
Chloroform

f. Reference Materials

Barror, Donald J. and Richard E. White. A Field Guide to the Insects of America North of Mexico. Boston: Houghton-Mifflin Company, 1970.

Brockman, C. Frank. Trees of North America. New York: Golden Press, 1968.

Burt, William and Richard P. Grossenheider. A Field Guide to Mammals. Boston: Houghton-Mifflin Company, 1964.

Campbell, Carlos, William F. Hutson, and Aaron Sharp. Great Smoky Mountain Wildflowers. Knoxville: University of Tennessee Press, 1970.

Conant, Roger. A Field Guide to Reptiles and Amphibians of the United States and Canada East of the 100th Meridian. Boston: Houghton-Mifflin Company, 1958.

Ditmars, Raymond L. A Field Book of North American Snakes. New York: Doubleday and Company, 1939.

Klots, Alexander. A Field Guide to Butterflies. Boston: Houghton-Mifflin Company, 1951.

Knudsen, Jens. Biological Techniques. New York: Harper and Row Company, 1966.

Mitchell, Robert T. and Herbert S. Zim. Butterflies and Moths. New York: Golden Press, 1964.

Peterson, R. T., and Margaret McKenny. A Field Guide to Wildflowers of Northeastern and North-Central North America. Boston: Houghton-Mifflin Company, 1968.

Petrides, George. A Field Guide to Trees and Shrubs. Boston: Houghton-Mifflin Company, 1958.

Pough, Frederick H. A Field Guide to Rocks and Minerals. Boston: Houghton-Mifflin Company, 1960.

Reid, George K. Pond Life. New York: Golden Press, 1967.

Rhodes, Frank H., Herbert S. Zim, and Paul R. Shaffer. Fossils. New York: Golden Press, 1962.

Peterson, Roger T. A Field Guide to the Birds. Boston: Houghton-Mifflin Company, 1947.

Sterling, Dorothy. Insects and the Homes They Build. New York: Doubleday and Company, 1954.

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Stupka, Arthur. Wildflowers In Color. New York: Harper and Row, 1965.

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Zim, Herbert S. and Ira N. Gabrielson. Birds. New York: Golden Press, 1956.

Zim, Herbert S. and Paul R. Shaffer. Rocks and Minerals. New York: Golden Press, 1957.

PHASE THREE
PROJECT IMPLEMENTATION

Project implementation has been realized primarily through the following phases:

a. Utilization of the mobile unit, included equipment and instructional materials with students.

b. In-service programs conducted for teachers and administrators of the Kingsport City School System.

c. In-service programs for teachers and administrators in other school systems.

d. Presentations to cooperating resource agencies and community groups.

e. Presentations to preservice science education classes at East Tennessee State University and the Kingsport University Center.

On the following page is a table giving the total numbers of groups, classes, students, and others directly involved through this process. Other phases of the implementation process have included:

a. Use of the mobile unit, equipment and instructional materials for two weeks as a part of the residence environmental education program at the Maryville College Environmental Education Center at Tremont.

b. Utilization of the mobile unit and equipment as a basic resource in cooperative school system--P.T.A. projects directed at the development of environmental study areas on the campus of each elementary school.

c. Use of the mobile unit and equipment in the Tennessee Valley Heritage Environmental Education Workshop at Tremont, April 27-29, 1973.

d. During the project period, a student from the University of Pennsylvania who was fulfilling his practicum requirements in Outdoor Education with T.V.A., spent a week in Kingsport. As a part of his schedule he conducted mobile unit activities.

MOBILE ENVIRONMENTAL EDUCATION LABORATORY PROJECT
SUMMARY OF IMPLEMENTATION

Phase of Implementation / Dates	Period I May 15, 1972- August 15, 1972		Period II August 16, 1972- November 15, 1972		Period III November 16, 1972 February 15, 1973		Period IV February 16, 1973 June 15, 1973		Totals Entire Project	
	No. of Groups or Classes	No. of People or Students	No. of Groups or Classes	No. of People or Students	No. of Groups or Classes	No. of People or Students	No. of Groups or Classes	No. of People or Students	No. of Groups or Classes	No. of People or Students
A. Utilization of the mobile unit, equipment and instructional materials with students			8	230	21	625	70	1645	99	2500
B. In-service programs for Kingsport City School System teachers			3	70	7	125			10	195
C. In-service programs for teachers and administrators in other school systems			8	385					8	385
D. Presentations to cooperating resource agencies and community groups			1	45	2	90	3	130	6	265
E. Presentations to pre-service science education classes at East Tennessee State University					2	50	3	160	5	210
Totals (Each Project Period)			20	730	32	890	76	1935	128	3555

PHASE FOUR
PROJECT DISSEMINATION

Throughout the course of the project, dissemination has been realized in the following ways:

a. A brief article describing the project was published in the August, 1972 issue of the Tennessee Conservationist.

b. A short article announcing the project appeared in the Kingsport Times-News.

c. A brief announcement of the project appeared in the June 8, 1972 issue of T.V.A. News.

d. A brief article describing the project was published in the December 1, 1972 issue of The Southern Sportsmen. (A copy of this article is included.)

e. A feature article concerning the project appeared in the December 19, 1972 issue of the Kingsport Times-News. (A copy of this article is included.)

f. The November, 1972 issue of the Newsletter of the Southeast Region of the Association of Interpretative Naturalists published a report on the project.

g. A brief article describing the project appeared in the February, 1973 issue of "The Environmental Educator," published by Slippery Rock State College in Slippery Rock, Pennsylvania.

h. The April, 1973 issue of The Tennessee Teacher carried an article describing the development and implementation of the mobile unit project. (A copy of this article is attached.)

i. Literature describing the project was distributed and discussed as a part of the Tennessee Environmental Education State Plan Writing Conference held at Henry Horton State Park, March 14-16, 1973.

j. The mobile unit was utilized and literature describing the project was distributed as a part of the Tennessee Valley Heritage Environmental Education Workshop held April 27-29, 1973 at Tremont.

k. The Project Director worked cooperatively with the T.V.A. Office of Public Information in developing an article on the development and implementation of the project for publication in the June, 1973 issue of T.V.A. Today.

l. The mobile unit has been committed for utilization in an area environmental education teacher workshop to be sponsored by King College and the Southwest TB&RD Association of Bristol, Virginia, in early Fall, 1973.

m. The mobile unit was used in an environmental education workshop for district conservationists from the East Tennessee districts of the Soil Conservation Service on May 29, 1973. The Project Director conducted this workshop.

n. A summary of the project was submitted for publication in the Newsletter of the National Association of Conservation Districts.

o. The Project Director has been asked to present a paper on environmental education, including the mobile unit, at the annual meeting of the Tennessee Academy of Science, November 16-17, 1973, at Vanderbilt University.

p. During the project period, 350 copies of the instructional activities have been distributed throughout the valley region. Requests are still being received for this publication.

q. Throughout the project period more than 750 information brochures describing the project have been distributed throughout the United States and Canada. (A copy of this brochure is included.)

r. Through June 1, 1973, 145 requests for information relating to the project have been received. Aside from numerous requests within the state, inquiries have come from the following:

Maine
Missouri
New York
South Carolina
North Carolina
Maryland
Michigan
Minnesota
Alabama
Ohio
Pennsylvania
New Jersey
Wisconsin
Florida
Virginia
Illinois
Georgia
Wyoming
Indiana
California
Idaho
Washington, D.C.
Colorado
Kentucky
Massachusetts
Mississippi
Nova Scotia, Canada

PHASE FIVE
PROJECT EVALUATION

INTRODUCTION

The major evaluation of a project of this type is primarily a product of the day-to-day process of implementation and, as a result, quite informal. Integrated with this informal evaluation process, however, are several factors which are definitely indicative of the project results. These factors are:

a. Number of requests for use of the mobile unit with classes.

b. Number of inquiries requesting information on project development, implementation and utilization.

c. Publicity, both local and nonlocal, received by the project.

d. Random conversation with students, teachers, and administrators involved in the project.

e. Continuous evaluation by the Project Director.

Formal project evaluation was centered around the development and use of an opinionnaire and questionnaire with project participants. Participants in the Summer Workshop were asked to complete a questionnaire evaluating the workshop and the results (see Phase II for evaluation results). During the fourth twelve week reporting period an opinionnaire was sent to randomly selected teachers who had utilized the mobile unit during the year. (A copy of this opinionnaire is included in the appendix.) The results of this evaluation are included in tabular form on page 31.

EVALUATION RESULTS

In interpreting the results of the opinionnaire and other aspects of project evaluation, the focus has been on two main areas:

a. Total project evaluation

1. Evaluation of the effectiveness of the mobile unit, curriculum materials, and in-service training.

2. Evaluation of the community, faculty, and student acceptance of the project.

3. An analysis of the impact of the project on teachers and students.

b. Evaluation of the mobile unit and the total program

Total Project Evaluation

Following is a break down of each of the three primary areas of emphasis as they relate to opinionnaire results and related aspects of evaluation:

a. Evaluation of the effectivenss of the mobile unit, curriculum materials, and in-service trsining.

Opinionnaire results relating to this area of emphasis can be summarized as follows:

1. Eighty-two percent of the teachers responding strongly agreed that the mobile environmental education laboratory project is a worthwhile curriculum adventure.

2. Nine out of ten teachers responding felt the mobile unit makes possible activities and investigations before not possible.

3. More than seventy percent of the teachers utilizing the mobile unit felt their understanding of environmental education had increased.

4. All teachers responding either agreed or strongly agreed that the mobile unit activities are satisfactorily related to classroom instruction.

5. Nine out of ten teachers felt that mobile unit activities can be easily related to other curriculum areas.

6. All teachers either agreed or strongly agreed that mobile unit instructional activities effectively promote investigations of environmental problems.

7. Ninety percent of the teachers questioned agreed that instructional materials appropriately relate the man-made and the natural environment.

8. All teachers responding agreed that mobile unit activities are most effective when preceded and followed by related classroom activities.

9. More than half of the teachers responding felt that mobile unit in-service programs satisfactorily explained project scope and sequence. (Director's Note: The most often reported comment was that in future projects even more time should be given to in-service training.)

Additional factors which are indicative of the effectiveness of the mobile unit, curriculum materials and in-service training are:

1. Throughout the project period more than 145 requests for information have been received from 27 states and Canada.

2. Requests for copies of the instructional materials, Investigations For A Mobile Environmental Education Laboratory, have far exceeded the supply. Including those distributed within the Kingsport School System, more than 350 copies have been distributed.

3. Eight in-service training programs were requested and conducted in area school systems. (Requests have already been received for the 1973-74 school year.)

b. Evaluation of the community, faculty, and student acceptance of the project.

Results from the opinionnaire were as follows:

1. More than ninety percent of the teachers responding felt that students looked forward to the arrival of the mobile unit.

2. All teachers responding agreed that taking the mobile unit to the students is more practical than taking the students to the mobile unit.

3. All teachers responding either agreed or strongly agreed that with the limited availability of funds, it is more feasible to invest in a mobile unit than an equivalent stationary unit.

Additional factors indicative of the community, faculty, and student acceptance of the project are:

1. Requests for use of the mobile unit with classes far exceeded the 99 classes and 2500 students that available scheduling time would allow.

2. Eleven presentations involving almost 500 people were requested and given to community, resource agency, and higher education groups.

3. Fourteen articles and reports describing the project have appeared in various publications and newsletters.

4. Through involvement in activities and in random conversation, it is the opinion of the Project Director that the interest and

enthusiasm displayed by students and teachers alike, is a valid indication of their acceptance of the project.

5. The number of classes and students involved in scheduled use of community resources, residence program and the mobile unit as compared to the two preceding years of program operation demonstrate a tremendous increase in involvement in environmental education activities. (Note: The following figures include only those activities directly scheduled through the program coordinator and are by no means indicative of the total number of classes and students involved.)

1970-71	1971-72	1972-73
55 classes 1,618 students and teachers	202 classes 5,217 students and teachers	421 classes 10,135 students and teachers

(Director's Note: It is the opinion of the Project Director that a large percentage of the increase in numbers from 1971-72 can be attributed to the interest and enthusiasm generated as a result of the mobile unit project.)

c. An analysis of the impact of the project on teachers and students.

In analyzing project impact, it is necessary that the long range goal of the total environmental education program in the Kingsport City School System be kept in mind.

Including environmental education in the curriculum is a response to both a need for educational improvement and a need for citizens who can identify, prevent and resolve problems in the process of maintaining and creating a quality environment. Responsible citizenship is a role of the school delegated it by society. Environmental education contributes to the achievement of this goal by focusing the existing curriculum upon the immediate surroundings of the student and related human processes.

By developing strong attitudes and values, environmental education attempts to achieve this goal. Strong rational attitudes are mandatory in the development of compatible environmental values. The role of the teacher is to develop in each student values and attitudes which eventually will lead to the students involvement in activities which help to maintain and improve a quality environment.

Values are thought to be derived from attitudes. Attitudes are believed to consist of three essential parts. Two of these are feelings and understandings. If a student feels strongly (aware) enough toward the environment and its problems and possesses a sufficient amount of accurate knowledge (understandings) and knows how he can help solve the problems, his attitudes may then contain a third component--a tendency or motivation to act. Environmental education seeks to develop the kind of behavior which helps to improve the quality of the environment.

Even though outward indications that compatible environmental behaviors have been developed are, in many cases, not evident until many years later, there are definite ways in which this project has and will continue to have an impact on students and teachers.

The social impact of the project has included:

1. The development of group process, reliance, and skills through involvement in group problem solving situations.

2. The development of an increased awareness of man's role in the total environment and the resulting problems.

3. The development of self-reliance and independence through participation in the problem solving process of environmental education.

4. The development of an increased awareness, knowledge, and involvement with community resources.

Physically, the project has extended the classroom onto the school campus and into the community, thus allowing for increased physical activity and exercise on the part of the students and teachers.

Scientifically and environmentally, the impact of the project can be summarized as follows:

1. Provided real-life application of problems.

2. Lowered the student/teacher ratio.

3. Extended previous learning experiences for small group and independent study.

4. Provided specialized environmental study equipment and the expertise of the project director.

5. Increased use of community resources.

6. Supplemented and enriched the total program and curriculum.

Evaluation of the Mobile Unit and the Total Program

Evaluation of the mobile unit project as it relates to the continuing development of the total environmental education program in the Kingsport City Schools is best illustrated by relating the mobile unit project results to the findings of a survey conducted during the first year of program operation. This survey, conducted in 1970-71, was directed at identifying the educational needs as they related to environmental education program

development in the Kingsport City Schools. Following are some of the findings of this initial survey and the role of the mobile unit, included equipment and instructional materials:

a. Concerning problems that exist in initiating and implementing environmental education programs, findings in the 1970-71 survey indicated:

1. Eight out of every ten teachers felt that problems lie in the availability of curriculum materials on environmental problems.

2. Eight out of ten teachers felt that problems lie in the teaching methods.

The mobile unit project has taken definite steps toward solving these problems. The development and implementation of Investigations For A Mobile Environmental Education Laboratory provides environmental oriented instructional materials as well as in-service activities for teachers. These activities and the in-service programs conducted by the Project Director have provided training in teaching methods.

b. When asked what the present educational system was doing for environmental education, the 1970-71 survey found:

1. Only two out of every ten teachers felt that students were independently investigating environmental problems.

2. Only four out of every ten teachers responding felt that students were evaluating alternatives to environmental problems.

3. Only three out of every ten teachers felt that students were acting on alternatives to environmental problems.

Results from the opinionnaire sent to randomly selected teachers who had used the mobile unit have indicated that the mobile unit approach is making progress in relation to student investigations and actions on alternatives to environmental problems. These results are:

1. More than ninety percent of the teachers responding agreed that the use of the mobile unit had increased the class' understanding of environmental problems.

2. Nine out of every ten teachers agreed that the mobile unit activities effectively promote investigation of environmental problems.

c. When questioned concerning changes in the educational system they would support, findings in the 1970-71 survey indicated that:

1. Nine out of every ten teachers would support changes in the educational system which would allow teachers to guide students in discovery and investigation of environmental problems.

2. Eight out of every ten teachers stated they would support changes in the school program requiring studies in the community.

The mobile unit project has definitely made contributions toward fulfilling these needs. With the use of the community oriented instructional materials, in-service training programs and activities, equipment and mobile unit flexibility, teachers are now able to guide students in discovery and investigation of environmental problems in the community.

The mobile unit approach, as a supplementary, yet integral part of a total environmental education program, offers many unique learning experiences which make education more relevant to the real-life experiences of the student and teacher. It is the opinion of the Kingsport City School System that the utilization of the mobile unit will continue to be broadened and expanded as it becomes an even more vital component in our efforts to develop appropriate environmental attitudes.

Plans for expanded future use of the mobile unit include:

a. Development of a special summer field oriented course in environmental education for secondary level students. The mobile unit would provide the basic resources for such a course.

b. Develop and operate a model microwatershed approach to the study of environmental problems in East Tennessee. Again, the mobile unit will provide the basic resources for such a model.

c. Increased utilization of the mobile unit with students and teachers.

d. Expansion of the use of the mobile unit in the development of environmental study areas on school campuses.

e. Utilization of the mobile unit as a basic resource for special projects, both independent and group.

SUMMARY

Throughout the course of the project no major scheduling or administration problems were encountered. Scheduling the use of the unit was handled on a request basis, however, in the future, it will probably be necessary to develop a formalized schedule.

In summarizing project evaluation based on the preceding results, the following conclusions are drawn:

a. The mobile unit approach to environmental education is a valid and practical approach in the development of a total environmental education program.

b. The mobile unit, instructional materials, and in-service training have more than met the stated objectives of the project, and in the process, were extremely effective in providing new environmental education experiences for students and teachers.

c. The total project was well accepted and supported by the community, faculty, and students.

d. The mobile unit project has had and will continue to have a definite impact on teachers and students of the Kingsport City School System.

MOBILE ENVIRONMENTAL EDUCATION LABORATORY PROJECT
SUMMARY OF EVALUATION

SA = Strongly Agree
A = Agree
A/D = Neither Agree or Disagree
D = Disagree
SD = Strongly Disagree
(Numbers indicate percentages)

		SA	A	A/D	D	SD
1.	The Mobile Environmental Education Laboratory Project is a worthwhile curriculum adventure.	82	18			
2.	With the limited availability of funds, it is more feasible to invest in a mobile unit than	64	36			
3.	Students look forward to the arrival of the mobile unit.	55	36	9		
4.	The mobile unit makes possible activities and investigations before not possible.	45	45	10		
5.	Participation in mobile unit activities has increased my understanding of environmental education.	27	45	18	10	
6.	Through utilization of the mobile unit more students now participate in environmental education than would have otherwise participated.	60	30	10		
7.	Use of the mobile unit has increased my class' understanding of environmental problems.	27	64	9		
8.	Mobile unit activities are satisfactorily related to classroom instruction.	45	55			
9.	Taking the mobile unit to the students is more practical than taking the students to the mobile unit.	55	45			
10.	Mobile unit activities promote problem solving abilities and the exchange of ideas among students.	45	45	10		
11.	Mobile unit activities can be easily related to other curriculum areas.	55	36		9	
12.	The mobile unit in-service programs satisfactorily explained project scope and proposed utilization.	27	27	36		10
13.	Mobile unit activities are most effective when preceded and followed by related classroom activities.	73	27			
14.	Mobile unit instructional activities effectively promote investigations of environmental problems.	36	64			
15.	Instructional materials appropriately relate the man-made and the natural environments.	20	70	10		
16.	The mobile unit project should be broadened and expanded.	50	40	10		

PROJECT COST ANALYSIS

The primary source of funding for the planning, development and implementation of the mobile environmental education laboratory was the Tennessee Valley Authority. Since it was a cooperative demonstration project, additional contributions were made by the Kingsport City School System. On the following page is an analysis of total project costs. Contributions by the cooperating school system have not been itemized, however, these contributions included the salary of the Project Director, office space, clerical help, and miscellaneous operating costs for the project.

Cost Analysis

Total Project Costs can be categorized as follows:

A. T.V.A. Funding			
1. Materials and Equipment			
Purchase of 1972 Econoline Van	$2,700.00		
Design and Construction of Van Storage Facilities	2,500.00		
Environmental Study Materials and Equipment for Stocking Van	5,000.00		
Total Materials and Equipment		$10,200.00	
2. Administrative and Clerical Costs			
Curriculum Materials Development Workshop	$2,100.00		
Total Administrative and Clerical		$ 2,100.00	
3. Instructional and Program Costs			
Workshop Participants	$4,700.00		
Consultants	1,500.00		
Total Instructional and Program		$ 6,200.00	
4. Supplies, Reproduction and Communication	$1,000.00		
Total Supplies, Reproduction and Communication		$ 1,000.00	
TOTAL T.V.A. FUNDING			$19,500.00
B. TOTAL KINGSPORT CITY SCHOOLS CONTRIBUTIONS			$10,000.00
C. TOTAL PROJECT COSTS			$29,500.00

APPENDIX

COMMUNITY RESOURCES

KINGSPORT CITY SCHOOLS
ENVIRONMENTAL EDUCATION PROGRAM
November, 1971

INTRODUCTION

Many excellent community resource people and community resource facilities are available in Kingsport and the surrounding area. As it's project for the 1970-71 school year, the Bays Mountain Curriculum Study Group compiled a list of available resource people and suitable resource facilities. It must be pointed out that these lists are in no way complete. A compilation of community resource facilities and community resource people will continually grow and change.

The community offers many opportunities for environmental understandings. It is hoped that this resource guide will assist you in taking advantage of these opportunities.

BAYS MOUNTAIN CURRICULUM STUDY GROUP, 1970-71

Helen Kite	Verna Ruth Hawk
Bernice Loggins	Mary Underwood
Linda Gilland	Anna Dickison
Beulah Bright	Jo Carol Gustke
Ruby Hunt	Ray Dockery
Martha Hall	Ethlyn Horne
Louise Hensley	Joyce Cooper
Charlotte Ryan	Jean Bridwell
Joyce Seal	Ronald Childress

COMMUNITY RESOURCE CONSULTANTS

Following the name of each resource person is the area of interest and the address and telephone number for arranging a classroom resource visit. If contacted well in advance, these people are usually happy to come to the classroom and speak on their professions, hobbies, or travels.

COMMUNITY RESOURCE FACILITIES

Following each listed community resource facility is the contact information necessary to arrange a visit. Arrangements for visiting any of the resource facilities should be made well in advance of the planned date of visitation.

COMMUNITY RESOURCE PEOPLE

Richard Alvery
Aerial Photography
126 E. Ravine Road
246-2406

T. R. Bandy III
Lawyer, Judge
4534 Belvedere Lane
239-9072

Dr. C. H. Barker
Wildlife, Hiking
1440 Fairridge
245-6846

John Beckler
Pollution Control Specialist
Tennessee Eastman Company
P. O. Box 511
246-2111, Ext. 2444

Rev. Douglas Berndt
Rocks
1102 Watauga Street
247-4262

Robert Bible
Legislator
1504 Pineola Avenue
245-9784

Ray Blanton
Chemist
TEC Stream Pollution Control
1920 Hermitage Drive
245-5598
TEC, 246-2111, Ext. 4891

Mrs. James Blessing
Nutritionist
2021 Fallwood Drive
247-7278

Dr. K. C. Brannock
Mineralogist
38 Cliffstone Apartments
245-9064

Dr. Sam Brown
Indian Relicks
Blackberry Hill
246-7652

Bob Burbitt
Rocks and Minerals
TEC Rock and Mineral Club
246-2111

Robert T. Butler
Industrialist
1801 Hermitage Drive
245-6957

N. Edgar Calhoun
Early Local History
1520 Kenmore Drive
245-2903

Robert Clear
City Planning
City Hall
245-5131

Robert L. Collins
Superintendent
Filter and Waste Treatment Plant
530 Belvue Avenue
245-1671

Bob Cording
Model Airplanes (Remote Control)
261 Lakeview Circle
239-6596

Allyn Dryden
Architect
2120 Montrose Avenue
247-3033

C. B. Duke IV
City Planning Specialist
2020 Canterbury Road
247-2574

Ralph Elsea
Horticulture (roses, orchids)
Route 3
239-9262

Dr. Kirk Finch
Chemist, TEC
246-2111, Ext. 2159

Mrs. Anthony (Georgia) Fugarino
Wild Flowers and Ferns
509 Bays Cove Circle
247-4846

H. C. Green, Jr.
Soil Conservation Service
Blountville, Tennessee
323-8012

Karl Goerdel
Wildlife Specialist
1514 Linville Street
245-1052

Ray Hunt
4524 Stagecoach Road
288-5182

Thomas Immen
Architect
4584 Old Stage Road
246-6323

Jerry Johnson
Meteorologist
Tri-City Airport
Blountville, Tennessee
323-5711

Milton Joyce
Agriculture Teacher
Fall Branch High School
348-7415

Dr. Elery Lay
Local History
320 Highridge Drive
245-6372

William Loest
Sewage Specialist
Glencliff Drive
239-6252

Dr. Edgar L. McDaniel
Chemist
2027 Bruce Street
245-3041

George Mueller
Forestry Specialist
2212 Pendragon Road
246-8829

Dr. Wilson Patton
Nuclear Physics
Tennessee Eastman Company
246-2111, Ext. 2585

Virgil Peck
Physicist
4579 Old Stage Road
245-8295

James Larry Poole
Architect
2141 Swannonoa Avenue
245-2335

Troy Price
Rocks and Minerals
Bays Cove Trail
246-6974

Mrs. Carl Roessler
Germany
3901 Ridgeline Drive
246-6780

Francis Sanders
Nutritionist
Central Office
Kingsport City Schools
245-3155

Dr. M. D. Shobe
Rocks and Minerals
1214 Linville Road
246-9752

Mrs. M. D. Shobe
Fossils
1214 Linville Road
246-9752

Mr. Arthur Stair
Electricity
1026 Wateree Street
245-4885

Harry Stallard
Airplanes
Kingsport City Schools
4598 Old Stage Road
288-2952

Mr. and Mrs. Hal T. Spoden
Local History (slides)
1638 Crescent Drive
246-6635

J. A. (Dick) Stout
Arrowheads, Old Books
2132 Memorial Boulevard
245-1736

John Sullins
Sewage Specialist
Mead Corporation
2005 E. Sevier Avenue
245-7306

Representative
Sullivan County Health Department
Diseases, Sanitation, Epidemics
Midland Drive
Kingsport, Tennessee
245-5165

Bill Todd
Lawyer
1322 Watauga Street
245-4422

Raymond Tharp
Slides of Israel
Route 12, Box 126
239-1397

Jimmy Walker
City Planning
1512 Kenmore Drive
246-9408

Harold Warrick
Slides on U. S. History
2030 Bruce Street
245-1912

James C. White
Industrialist
1218 Linville Street
245-4242

COMMUNITY RESOURCE SITES

Andrew Johnson National Historic Site
(home, tailor shop, cemetary)
Greeneville, Tennessee
Contact: Superintendent of A.J.N.H.S.
Greeneville, Tennessee 37743

A. W. Ratliff Farm
Orebank Road
Kingsport, Tennessee
Contact: Mr. A. W. Ratliff
Kingsport, Tennessee
288-6602

Boone Dam
Airport Road
Contact: TVA
Kingsport, Tennessee
247-7491

Bristol Caverns
Route 3
Bristol, Tennessee 37629
Contact: Henry Hatcher
Route 3
Bristol, Tennessee 37620

Erwin National Fish Hatchery
Route 23
Erwin, Tennessee 37650
Contact: Superintendent
Erwin National Fish Hatchery
Erwin, Tennessee 37650

Exchange House
Orebank Road
Kingsport, Tennessee
Contact: Mr. Ben Brown
1226 Linville Street
Kingsport, Tennessee
246-2745

Kingsport City Landfill
Idlehour Road
Contact: City Hall
245-5131

Kingsport Water Purification Plant
Konnarock Road
Contact: City Hall (Water Department)
245-5131

Kingsport Waste Water Treatment Plant
Industry Drive
Contact: Mr. Collins, Supervisor
City Hall
245-5131

Lyle Construction Company
433 S. Wilcox Drive
Kingsport, Tennessee
Contact: Mr. Summers P. Lyle
245-3174

Museum of Atomic Energy
Oak Ridge, Tennessee
Contact: Oak Ridge Institute of
Nuclear Science
P. O. Box 117
Oak Ridge, Tennessee

Netherland Inn
Netherland Inn Road
Kingsport, Tennessee
Contact: Mr. Ben Brown
1226 Linville Street
246-2745

Pet Dairy Company
Konnarock Road
Kingsport, Tennessee
Contact: Mr. Harry Profitt
Plant Manager
245-5154

E. T. S. U. Planetarium
Geography Building, E.T.S.U. Campus
Johnson City, Tennessee
Contact: Mr. Darling
Geography Research Department
926-1112

Reece Memorial Museum
Johnson City, Tennessee
Contact: Museum Affairs
E. T. S. U.
Johnson City, Tennessee
926-1112, Ext. 392

Rocky Mount
Piney Flats, Tennessee
Contact: Director, Rocky Mount
Bluff City, Tennessee 37686
538-5307

Tri-Cities Environmental
Services Administration
Tri-City Airport
Blountville, Tennessee
Contact: Jerry Johnson
Chief Meterologist
323-5711

Barter Theatre
Abingdon, Virginia
Contact: Mrs. Pearl P. Hayter
Business Manager
Barter Theatre
Abingdon, Virginia 24210

Davy Crockett Birthplace
Limestone, Tennessee
Contact: M. R. Stonecypher
Box 163
Limestone, Tennessee 37681

Kingsport City Hall
225 W. Center Street
Kingsport, Tennessee 37663
Contact: Mr. Ted McCown
Director of Public Relations
245-5131

Kingsport Times-News
701 Lynn Garden Drive
Kingsport, Tennessee
Contact: Managing Editor
Kingsport Times-News
Kingsport, Tennessee
246-8121

Mason and Dixon Lines, Inc.
E. Stone Drive
Kingsport, Tennessee
Contact: Mr. Donald Good
Mason and Dixon Lines
246-4121

Modern Bakery, Inc.
1860 N. Eastman Road
Kingsport, Tennessee 37664
Contact: Mrs. Geneva Pridemore
Modern Bakery, Inc.
1860 N. Eastman Road
Kingsport, Tennessee
246-6155

Others: Golf Courses
Bridges
Cemetaries

WKPT-TV
222 Commerce Street
Kingsport, Tennessee
Contact: 245-4161

Kingsport Fire Department
Kingsport, Tennessee
Contact: Station No. 1
Island Street
245-2411

Station No. 2
E. Center Street
245-2511

Station No. 3
Memorial Boulevard
245-3621

Station No. 4
W. Stone Drive
245-2531

Kingsport Public Library
400 Broad Street
Kingsport, Tennessee
Contact: Mr. Cal Hendrix, Director
245-3141

WJHL-TV
137-145 W. Main Street
Johnson City, Tennessee 37601
Contact: Mr. Clyde T. Roberts
Promotion Director
WJHL-TV
Johnson City, Tennessee 37601
926-2151

Bays Mountain Park and Planetarium
Route 4
Kingsport, Tennessee 37664
Contact: Mr. Ronald Childress
Teacher-Naturalist
Kingsport City Schools
Kingsport, Tennessee
245-3155

Allandale Farms
Knoxville Highway
Kingsport, Tennessee
Contact: Allandale Farms (246-6832)

Reservoirs
Lakes
City Parks

March 3, 1972

Mr. Lynn Seeber
General Manager
Tennessee Valley Authority
New Sprankle building
Knoxville, Tennessee 37902

Dear Mr. Seeber:

I am writing in regard to Mobile Environmental Laboratories such as the one proposed for T.V.A.'s Norris Dam Reservation.

The Kingsport City School System is actively involved in Environmental Education and, as a result, we are extremely interested in any unique and innovative programs which would serve to enlarge and expand the scope of our present program.

Based on information we have reviewed relating to the utilization of Mobile Environmental Laboratories, we believe the addition of a program of this type would greatly expand and improve our existing efforts. We know of no such demonstration projects for total environmental education in the state or southeast. The resulting experiences from such a project could be shared with these people responsible for the Norris Dam Reservation Program as well as serve as a demonstration model for other school systems in the Tennessee Valley Watershed.

I am requesting any information you may have relating to program development and possible funding of such a demonstration project by the Tennessee Valley Authority. Enclosed is a brief outline of how such a project would be developed and implemented by the Kingsport City School System.

Thank you.

Sincerely,

Ralph E. Evans

ej

Enclosure

PROPOSAL FOR DEVELOPMENT OF
MOBILE ENVIRONMENTAL LABORATORY

Description of the School System

The Kingsport City School System is comprised of seven elementary schools, two junior high schools and one senior high school. The total number of people to be served by such a project would include some 6,700 students and 375 teachers.

The Kingsport City School System presently employs a full-time, system-wide Teacher-Naturalist who has the primary responsibility for coordinating the total Environmental Education Program. The Teacher-Naturalist would serve as Program Coordinator for a Mobile Environmental Laboratory thus eliminating this cost from the project.

Needs

The needs for the development and implementation of a Mobile Environmental Laboratory Program are felt in three areas. Listed in order of priority they are:

a. Teacher Training and In-Service

In the past, teacher training institutions have failed to prepare elementary teachers in areas relating to the environmental sciences. As a result, most teachers have no background or training for teaching Environmental Education. A Mobile Environmental Laboratory would serve as a basic resource for conducting teacher workshops and in-service programs. These workshops and in-service programs would be conducted in the Environmental Study areas at each school as well as on site at selected community resource facilities.

b. Elementary Levels (K-6)

In the area of elementary education there is an overall lack of equipment and expertise for teaching environmental education. The development and implementation of a Mobile Environmental Laboratory Program, with equipment and qualified Program Coordinator, would eliminate much of this problem.

The seven elementary schools of the Kingsport City School System have developed or are in the process of developing Environmental Study Areas on the campus of each school. The utilization of these areas would be greatly expanded with the equipment and expertise made available through a Mobile Environmental Laboratory and Program Coordinator.

c. Secondary Levels (7-12)

At the secondary level there is a tremendous lack of environmental field study equipment and related expertise. As a result, the major portion of Environmental Education instruction occurs within the classroom. A Mobile Environmental Laboratory would provide the equipment and the Program Coordinator the expertise to expand the program beyond the classroom. The opportunities for study of natural and man-made environments are unlimited at these grade levels. Major emphasis would be on the utilization of community

resource facilities, urban and rural, with the Mobile Environmental Laboratory and Program Coordinator serving as basic instructional resources. A listing of these resource facilities would be compiled and curriculum materials developed for use in conjunction with the Mobile Environmental Laboratory. The curriculum materials, Mobile Environmental Laboratory and community resource facilities such as landfills, sewage disposal plants, historical areas, natural and wilderness areas, commercial developments, and industrial developments would be utilized to reinforce concepts being taught in the classroom.

Curriculum Materials Development

The program developed for use with the Mobile Environmental Laboratory will integrate all curriculum areas. With the Mobile Environmental Laboratory serving as the primary resource facility, activities would be developed which include man's relationship with the natural and man-made surroundings, including the relation of population pressures, pollution, resource allocation and depletion, conservation, technology, and urban and rural planning to the total human environment. Economic, social and political aspects of environmental deterioration will be included where relevant.

Curriculum materials would be developed by a teacher in-service group during an eight week period beginning June 12, 1972, and ending August 4, 1972. This group will be composed of a director, five teachers and one clerk. The Program Coordinator for the entire project will serve as director. Teachers would include one from the senior high level, two from the junior high level and two from the elementary level (one primary and one intermediate). Consultant expertise would be used throughout development.

Project Development Outline and Schedule

The development and implementation of a program utilizing a Mobile Environmental Laboratory would follow the following pattern of development.

1. Employment of Program-Coordinator. As the Kingsport City School System Teacher-Naturalist would serve as Program-Coordinator, project development would begin immediately.
2. Purchase of Dodge Van. Design and install storage units (March-April, 1972).
3. Purchase of equipment and material for unit (April-May, 1972).
4. Selection of participants for development of curriculum materials (May, 1972).
5. Development and preparation of curriculum materials (June-August, 1972).
6. Initiate implementation process through work with classrooms, teacher workshops and in-service programs.

TENTATIVE BUDGET PROPOSAL FOR
DEVELOPMENT OF MOBILE ENVIRONMENTAL LABORATORY

Materials and Equipment		
Mobile Van (with built in storage compartments)	$4,500	
Materials and Equipment (Scientific equipment for stocking Van)	5,000	
Total Materials and Equipment		$ 9,500
Administrative and Clerical (Curriculum Materials Development)		
Project Director	1,400	
Clerk ($2/hr. x 8 hr. x 40 days)	640	
Instructional and Program Salaries		
Teachers (5 x $21 x 40 days) (4 hr. per day)	4,200	
Consultants (5 consultants x 3 days x $100)	1,500	
Fixed Charges (approximate retirement and social security costs)	780	
Total Administrative, Clerical and Instructional		8,520
Supplies, Reproduction and Communication		
Paper		
Printing		
Multilith Materials		
Binding		
Miscellaneous Supplies	1,000	
Total Supplies, Reproduction and Communication		1,000
GRAND TOTAL		$19,020

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE 37902

TV36576A

May 12, 1972

Dr. Ralph E. Evans, Superintendent
Kingsport City Schools
1701 East Center Street
Kingsport, Tennessee 37664

Dear Dr. Evans:

Upon acceptance this letter will serve as an agreement between the Tennessee Valley Authority (hereinafter "TVA") and the Kingsport City School Board (hereinafter "Board") under which TVA and Board will cooperate in the conduct of a demonstration project (hereinafter "project") in environmental education for teachers and students, utilizing a mobile laboratory. Said agreement shall be effective as of May 15, 1972, and shall terminate on June 15, 1973. The primary objective is to demonstrate and verify a new concept in environmental education for this region by (1) providing inservice training to elementary (including preschool), secondary, and postsecondary education personnel to enable them to participate effectively in environmental education programs; (2) developing materials designed to assist the introduction of environmental studies in existing programs and/or strengthen the content of existing environmental programs at all educational levels; and (3) developing curricula which will provide useful learning experiences leading to an understanding of environmental principles, problems and their causes, and possible solutions to those problems as envisioned by the Environmental Education Act, 20 U.S.C. § 1531 et seq. (1970).

Board agrees to:

1. Purchase a 1972 mobile unit; have the necessary storage facilities built in; and equip the unit with scientific equipment and material for conducting environmental studies.

2. Employ a project director to direct, administer, and coordinate the environmental education program.

3. Develop curriculum material for grades K through 12, utilizing the mobile unit as a teaching tool at natural areas, the school and school grounds, and in surrounding communities. Special emphasis will be given to environmental problems associated with the urban or manmade environment.

4. Implement project by using the curriculum material, the mobile environmental education laboratory, and the facilities at Kingsport City Schools during the 1972-73 school year.

5. Evaluate project every 12 weeks during the term of the agreement, said evaluations to serve as the basis of the comprehensive report provided for below.

6. Prepare and submit to TVA by June 15, 1973, a comprehensive report, acceptable to TVA, evaluating and describing the project. The report shall discuss the criteria used for selection of equipment and materials; evaluate the effectiveness of the mobile unit, curriculum materials, and inservice training; describe the manner in which administrative and scheduling problems were overcome; evaluate community, faculty, and student acceptance of the project; and include an analysis of the impact of the project on teachers and students. In addition the report shall contain such further information and exhibits as may be mutually agreed to by Board and TVA.

7. Board agrees to release, indemnify, and hold harmless the United States, TVA, their agents, servants, and employees from any and all liability for personal injuries, property damage, or loss of life or property arising out of or in any way connected with this demonstration project. Board also agrees to procure and maintain in effect a policy of comprehensive general liability insurance and automobile liability insurance to protect against bodily injury or property damage arising out of or in any way connected with the use of the mobile unit, such insurance to be in amounts of not less than $100,000 per person and $300,000 per occurrence and $50,000 per occurrence with relation to property damage. Said policies are to include TVA as an additional insured and are to be approved by TVA.

Contingent upon appropriations of funds by Congress deemed sufficient by TVA to support such undertakings, TVA agrees to:

1. Provide such technical advice and assistance as may be requested by Board and as TVA deems it is in a position to furnish in planning and conducting work to be performed as a part of the project.

2. Pay for actual costs of the project up to a maximum of Nineteen Thousand Five Hundred Dollars ($19,500), payment to be made

upon receipt of invoices from Board certifying that invoiced amounts have been used for and are reasonably related to program purposes in accordance with this agreement; provided, however, that Two Thousand Dollars ($2,000) will be withheld pending receipt of the required report.

No member of or delegate to Congress or resident commissioner or any officer, agent, or employee of TVA, or member of Board, shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom, but this provision shall not be construed to extend to a corporation or unit of government contracting for its or for the public's general benefit.

It is further agreed that this contract and the activities authorized herein shall be administered and conducted in accordance with the provisions of Title VI of the Civil Rights Act of 1964 and Part 302 of Chapter II in Title 18 of the Code of Federal Regulations, and any future amendments to either, which provisions are incorporated herein by reference and made a part hereof.

If the foregoing accurately reflects our agreement, please indicate your acceptance by signing the original and two copies of this letter and return them to me. You may keep the extra copy for your files.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

John E. Mastry
Director of Personnel

Approved this 17th day of May, 1972.

Superintendent
Kingsport City Schools

Law
15

TENTATIVE OUTLINE FOR SUMMER WORK

I. Prepare a community resource facility guide.

II. Develop criteria for selecting equipment for mobile unit. Select equipment using these criteria.

III. Develop curriculum materials designed to assist the introduction of environmental studies in existing programs and/or strengthen the content of existing environmental programs in the following areas:

   A. In-service education
   B. Elementary level
   C. Secondary level

IV. Develop a plan for implementing the project in all related areas.

V. Develop methods of evaluating the project in relation to:

   A. Total effectiveness of mobile unit curriculum materials and in-service training
   B. Acceptance of the project by community, faculty, and students
   C. Overall impact of project on teachers and students

SUMMER WORKSHOP SCHEDULE

Date	Time	
Monday, June 12	8:00 A.M. - 12:00 Noon	
Tuesday, June 13	8:00 A.M. - 4:00 P.M.	
Wednesday, June 14	8:00 A.M. - 4:00 P.M.	
Thursday, June 15	8:00 A.M. - 4:00 P.M.	
Friday, June 16	8:00 A.M. - 12:00 Noon	
Monday, June 19	8:00 A.M. - 4:00 P.M.	
Tuesday, June 20	8:00 A.M. - 4:00 P.M.	
Wednesday, June 21	8:00 A.M. - 12:00 Noon	(Consultant, H. C. Green)
Thursday, June 22	8:00 A.M. - 12:00 Noon	
Friday, June 23	8:00 A.M. - 4:00 P.M.	(Consultant, Dean Bennett)
Monday, June 26	8:00 A.M. - 4:00 P.M.	
Tuesday, June 27	8:00 A.M. - 4:00 P.M.	
Wednesday, June 28	8:00 A.M. - 12:00 Noon	
Thursday, June 29	8:00 A.M. - 12:00 Noon	
Friday, June 30	8:00 A.M. - 4:00 P.M.	(Consultant, Charles Carpenter)
Wednesday, July 5	8:00 A.M. - 4:00 P.M.	
Thursday, July 6	8:00 A.M. - 4:00 P.M.	
Friday, July 7	8:00 A.M. - 4:00 P.M.	(Consultant, Terry McCormick)
Monday, July 10	8:00 A.M. - 4:00 P.M.	
Tuesday, July 11	8:00 A.M. - 4:00 P.M.	
Wednesday, July 12	8:00 A.M. - 12:00 Noon	
Thursday, July 13	8:00 A.M. - 12:00 Noon	
Friday, July 14	8:00 A.M. - 4:00 P.M.	
Monday, July 17	8:00 A.M. - 4:00 P.M.	
Tuesday, July 18	8:00 A.M. - 12:00 Noon	
Tuesday, August 1	8:00 A.M. - 12:00 Noon	

SUMMER WORKSHOP EVALUATION

1. What do you feel is the likelihood of integrating the environmental education activities that have been developed into the individual classroom?

2. Is there a need for some type of follow-up activity or workshop after a year of implementation? If so, what would you suggest?

3. What do you feel were the strong points of this workshop?

4. What suggestions or changes would you make for improvement?

5. Evaluate the use of consultant expertise in a workshop of this type?

6. What do you feel is your role in project implementation during the coming year?

Comments:

7-13-72

December 1, 1972

Students, Adults Use Mobile Lab in Nature Study

KINGSPORT—An investigation of man's relationship with natural and man-made surroundings to the total human environment is being studied by students in the Kingsport school system through the use of a mobile unit designed specifically for the project.

In May, 1972, the Kingsport City School System received a grant from the Tennessee Valley Authority to develop and implement a Mobile Environmental Education Laboratory as a demonstration project.

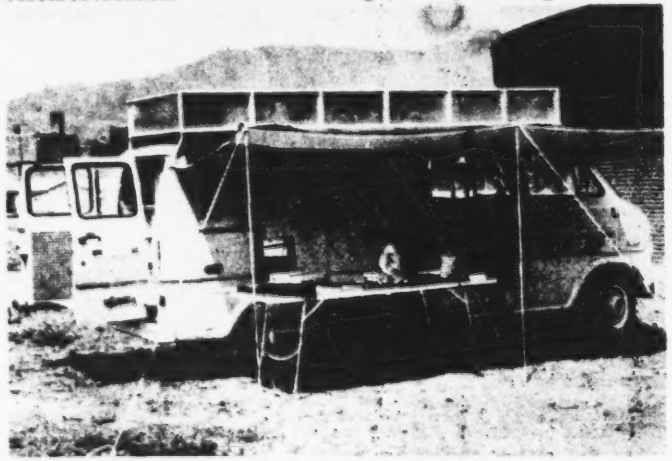
The basis for the entire project is the utilization of a 1972 Ford Econoline van designed and equipped for environmental studies. The van is primarily used in environmental study areas on site at the various schools and selected community resource facilities.

Materials are directed at all grade levels and integrate all curriculum areas. With the mobile unit serving as the primary source, investigations were developed which include man's relation with natural and man-made surroundings, including the relation of population pressures, pollution, resource allocation and depletion, conservation, technology, and urban and rural planning to the total human environment. Economic, social and political aspects of environmental relationships were considered throughout development.

Materials for utilizing the mobile unit were developed in a summer curriculum development workshop held June to August, 1972. participants in the workshop included one senior high, two junior high and two elementary school classroom teachers. The systemwide Teacher-Naturalist is serving as director of the entire project. Consultants were utilized during the workshop.

According to Ronald B. Childress, project director, the primary objective of the project is to demonstrate and verify a new concept in environmental education three methods.

The project is designed to provide in-service training to education personnel to enable them to participate effectively in environmental education programs; to develop materials designed to assist the introduction of environmental studies at all school levels; and to develop curricula to provide useful learning experiences leading to an understanding of environmental principles, problems and their causes, and possible solutions to those problems.



Education On The Move

Kingsport City School's Environmental Education Lab offers a variety of experiences in environmental education for student and adult alike.

Students Given First-Hand Look With Rolling Lab

By MARY KISS
Times-News Staff Writer

When sixth grade science classes in Kingsport schools go out to Reedy Creek to take a first-hand look at the condition of the water, they bring along their own rolling laboratory.

The "mobile environmental education lab" was supplied to the city school system by the Tennessee Valley Authority as part of $19,500 grant for a demonstration project in environmental education.

The well-stocked, 1972 Ford Econ-o-Line van is specially designed and equipped for environmental studies, and is expected to help in training teachers and students in recognizing and solving environmental problems, according to Ron Childress, teacher-naturalist for the Kingsport schools.

The classes emphasize man's impact on the world, not just "bird and bunny" nature study, Childress said.

He said teachers from elementary, junior high or Dobyns-Bennett High School science classes can borrow the mobile lab whenever they need equipment for classwork at school or on field trips.

Even third-graders can learn to use a thermometer to see how varying water temperatures affect plant and animal life in a creek like Mad Branch, Childress said. Youngsters in the upper elementary grades can learn the careful use of the microscopes carried in the van and then study the tiny organisms in a bit of soil or a drop of water.

And high school students can take the rolling lab along to Dickson Nature Park or Roller Woods to study the texture of the soil and measure its water content and pH value.

The van carries $5,000 worth of equipment — also part of the TVA grant. All the items aboard were selected by Childress to meet the needs of the demonstration project, which is designed to "verify a new concept in environmental education."

"It would be impossible to buy the amount of equipment we need for each school, but the van amounts to a mobile storehouse of environmental study equipment which can go wherever we want it," Childress said.

A team of city school teachers worked out plans for the environmental education program at a seven-week workshop last summer.

During the session, the teachers, with the help of some consultants from the community, wrote material for a 224-page curriculum guide. The book is filled with information on ways of using the mobile equipment for science classes on all grade levels. Copies have been distributed to science teachers throughout the school system.

Childress said the mobile lab is a valuable supplement to the city schools' total environmental education program, which also includes classes on Bays Mountain and work in classrooms and in campus outdoor nature areas and on field trips. Classes visit community resources such as the sewage and water treatment plants and historical sites, and some groups attend week-long sessions at the Environmental Education Center at Tremont.

Wood cabinets, designed by Childress, hold a wide range of lab instruments and materials within easy reach inside the van. There are binoculars, geology equipment such as rock picks and collecting sacks, water test bottles, beakers, dissecting equipment, microscopes, stream and soil thermometers and clipboards for note-taking. The van also contains a small library of nature books for identifying rocks, birds, plants, trees and insects.

The van carries its own "tent," a six-foot canopy with poles for shelter from the weather; and the back of the truck opens up to reveal a folding table and blackboard.

"The curriculum is designed around a problem-solving approach," Childress said. "The student does an investigation, collecting some type of data, and he uses the data to make an evaluation. From this he formulates suggestions for some type of remedial or constructive action.

"When a group of students test the water in a stream and their collected data shows pollution, they try to discover where the pollution comes from, how it gets into the water, and then make recommendations on how to overcome it. If possible, they may write letters to those responsible."

The project is a pace-setter in the environmental education field, and has drawn inquiries from schools in Missouri, Wyoming, New York, North and South Carolina, Alabama and Minnesota, Childress said.

In addition to its science-classwork, the van is also being used for teacher in-service training and for demonstrations for teachers in neighboring counties.

SCHOOLYARD LABORATORY — While students watch, Kingsport teacher-naturalist Ron Childress performs a soil test, using equipment from the school system's mobile environmental lab. The girls are students in Mrs. Jean Bridwell's sixth grade class at Washington School. Times-News Photo — Charles Dean.)

Students investigating environmental problems will often become committed to finding alternatives or solutions.

Using soil samples from their own campuses, fifth graders study the environmental factors that influence soil.

We Put Our Laboratory On Wheels

By RONALD B. CHILDRESS
Environmental Project Director
Kingsport City Schools

The Kingsport City School System began planning for a total environmental education program, kindergarten through grade twelve, in 1970. Based on his belief that environmental education must become a priority and that the educational system has a key role to play in producing citizens who can make intelligent decisions about resource use and environmental quality, Superintendent Ralph E. Evans, initiated the program by hiring an environmental education coordinator for the school system.

Kingsport's program is inter-disciplinary, activity and involvement oriented, and directed toward making education relevant to the real life experiences of students. It is founded on the realization that there is a definite need for learning experiences that help students become (1) aware of environmental problems; (2) knowledgeable and accurately informed about environmental problems; (3) involved in finding alternatives or solutions to these problems; and (4) committed to some type of constructive action to remedy these problems. Paralleling the need for new learning experiences is the shortage of the necessary environmental study equipment and proper instructional materials in most elementary and secondary schools.

With these needs and philosophy in mind, we worked with Jonathan Wert, TVA's educational relations officer concerned with environmental education, to develop instructional material designed around the use of a mobile unit. Objective: To improve the quality of education in the valley region.

A 1972 Ford econ-o-line van, equipped with storage compartments housing the environmental study equipment, serves as the basic teaching tool. Teachers, consultants, and representatives from cooperating resource agencies have developed curriculum materials for the mobile unit. All aspects of environmental education—population pressures, pollution, resource allocation and depletion, conservation, technology, and urban and rural planning—are related to the total human environment; our instructional units were therefore designed and written for use in a variety of areas ranging from sewage treatment plants in the urban environment to natural or wilderness areas in the rural environment. Emphasis is placed on man's interaction and interrelation with both natural and manmade environments.

During initial stages of implementation, the mobile unit is used primarily for in-service training programs for teachers. We have prepared special teaching units for this purpose.

Educators from many school systems have indicated an interest in this project and in having the mobile unit demonstrated as part of in-service programs and workshops. Although the mobile environmental education laboratory is primarily being used for Kingsport City Schools, we work with other school systems insofar as practical and are interested in sharing our experiences with others. □

MOBILE ENVIRONMENTAL EDUCATION LABORATORY
KINGSPORT CITY SCHOOLS
EVALUATION FORM

As a part of the cooperative demonstration project in environmental education being conducted by the Kingsport City School System and the Tennessee Valley Authority, it is necessary to evaluate the effectiveness of the mobile unit, included equipment, and instructional materials. As a part of this evaluation an effort is being made to survey the opinion of those teachers and others who have participated in mobile unit activities.

Please respond to the following questions by circling your response:

SD = Strongly Disagree
D = Disagree
D/A = Neither Agree or Disagree
A = Agree
SA = Strongly Agree

1.	The Mobile Environmental Education Laboratory Project is a worthwhile curriculum adventure	SA A A/D D SD
2.	With the limited availability of funds, it is more feasible to invest in a mobile unit than an equivalent stationary unit	SA A A/D D SD
3.	Students look forward to the arrival of the mobile unit	SA A A/D D SD
4.	The mobile unit makes possible activities and investigations before not possible	SA A A/D D SD
5.	Participation in mobile unit activities has increased my understanding of environmental education	SA A A/D D SD
6.	Through utilization of the mobile unit more students now participate in environmental education than would have otherwise participated	SA A A/D D SD
7.	Use of the mobile unit has increased my class's understanding of environmental problems	SA A A/D D SD
8.	Mobile unit activities are satisfactorily related to classroom instruction	SA A A/D D SD
9.	Taking the mobile unit to the students is more practical than taking the students to the mobile unit.	SA A A/D D SD
10.	Mobile unit activities promote problem solving abilities and the exchange of ideas among students.	SA A A/D D SD
11.	Mobile unit activities can be easily related to other curriculum areas.	SA A A/D D SD
12.	The mobile unit inservice programs satisfactorily explained project scope and proposed utilization.	SA A A/D D SD

(over)

13.	Mobile unit activities are most effective when preceded and followed by related classroom activities.	SA	A	A/D	D	SD
14.	Mobile unit instructional activities effectively promote investigations of environmental problems.	SA	A	A/D	D	SD
15.	Instructional materials appropriately relate the man-made and the natural environments.	SA	A	A/D	D	SD
16.	The mobile unit project should be broadened and expanded.	SA	A	A/D	D	SD

T.M.
Jan., 1973

MOBILE ENVIRONMENTAL EDUCATION LABORATORY

KINGSPORT CITY SCHOOLS
Kingsport, Tennessee 37664
(May, 1972 - June, 1973)

Superintendent of Schools
Dr. Ralph E. Evans

Project Director
Ronald B. Childress

Project Consultant
Jonathan Wert
Environmental Education Specialist
Tennessee Valley Authority

ACKNOWLEDGEMENTS

The Kingsport City School System is indebted to the following people for their assistance and interest in planning, developing and implementing the mobile environmental education laboratory project:

Consultants

Mr. Charles D. Carpenter
Director
Mobile Science Laboratory
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Albert Lea, Minnesota 56007

Dr. Dean Bennett
Project Director
Maine Environmental Education Project
Yarmouth, Maine 04096

Mr. Terry McCormick
Science Coordinator
Johnson City Schools
Binghamton, New York 13903

Mr. H. C. Green
District Conservationist
Sullivan County
Soil Conservation Service
Blountville, Tennessee 37617

Mr. Jonathan Wert
Environmental Education Specialist
Tennessee Valley Authority
Knoxville, Tennessee 37902

Workshop Participants

Mr. Dalton Bloomer
Social Studies Teacher
John Sevier Junior High School
Kingsport, Tennessee 37660

Mr. Don Little
Science Teacher
Ross N. Robinson Junior High School
Kingsport, Tennessee 37660

Mr. David Ingram
Science Department Chairman
Dobyns-Bennett High School
Kingsport, Tennessee 37664

Mrs. Anna Dickison
Classroom Teacher
Lincoln Elementary School
Kingsport, Tennessee 37664

Mrs. Louise Hensley
Classroom Teacher
Johnson Elementary School
Kingsport, Tennessee 37664

Our gratitude is also expressed to Mrs. Grace Jones and Mrs. Alice Helton for clerical assistance, to Mrs. Betty Hyder and Mrs. Ruth Anderson for artistic contributions to this project, and to Keith Oaks and Steven Hutton, Mechanical Drawing students at Dobyns-Bennett High School, for preparing the mobile unit design drawings.

A special note of thanks is expressed to the Tennessee Valley Authority for financial and technical assistance, and especially to Mr. Jonathan Wert, T.V.A.'s Environmental Education Specialist, for his interest, assistance, and expertise provided throughout the project.

Ronald B. Childress
Ronald B. Childress
Project Director

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INTRODUCTION

In May, 1972, the Kingsport City School System received financial assistance from the Tennessee Valley Authority to plan, develop, and implement, as a demonstration environmental education project, the utilization of a mobile laboratory for conducting environmental studies.

Project Basis

When initially investigating the possibility of developing and utilizing a mobile unit, the Kingsport City School System identified four needs which would be fulfilled through the use of the mobile unit approach. These needs and the role of the mobile unit are:

a. Traditionally, teacher training institutions have failed to prepare elementary and secondary teachers in the methods and techniques necessary to conduct environmental investigations. The mobile environmental education laboratory serves as a basic resource for conducting teacher workshops and in-service training sessions in environmental study areas at each school as well as on-site at selected community resource facilities.

b. A shortage of instructional materials designed for use with community resources curtailed the use of many valuable resource facilities. Instructional materials designed for use with the mobile unit and focused on community resources were developed as a major component of the total project.

c. A lack of the necessary equipment and materials for conducting environmental investigations placed limitations on the types of activities that could be carried on. The mobile unit and included equipment provides resources, previously unavailable, for conducting environmental studies.

d. The inconvenience, loss of time, and expense involved in providing transportation to community resource facilities distant from the school constituted a major logistical problem for teachers. Through use of the mobile unit, included equipment, and community focused instructional activities, many activities previously requiring transportation can now be conducted on-site at the school or at community resource facilities within walking distance.

Project Objectives

The primary objective of this project is to demonstrate and verify a new concept in environmental education for the Kingsport City School System by:

a. providing in-service training to elementary (including preschool), secondary, and postsecondary education personnel to enable them to participate effectively in environmental education programs;

b. developing materials designed to assist the introduction of environmental studies in existing programs and/or strengthen the content of existing environmental programs at all educational levels;

c. developing curricula which will provide useful learning experiences leading to an understanding of environmental principles, problems and their causes, and possible solutions to those problems.

Through mobile unit activities students are involved in learning experiences leading to an understanding of environmental principles, problems and their causes, and possible solutions to those problems.

PROGRAM DESCRIPTION

Philosophy and Approach

Centered around environmental problems and the wise use of resources, Kingsport's environmental education program is interdisciplinary, activity focused, involvement oriented, and directed toward making education more relevant to the real life experiences of students.

The total program is founded on the realization that there is a definite need for learning experiences which help students become:

a. Aware of the natural and man-made environment and the related problems.

b. Knowledgeable and accurately informed about the total environment and the related problems.

c. Motivated to find alternatives or solutions to these problems.

d. Committed to and involved in some type of constructive action to remedy these problems.

With this philosophy as the foundation, the mobile unit, included equipment, and instructional materials become an integral part of the total environmental education program of the Kingsport City School System. Other phases of the program include day-use of community resource facilities, participation in a residence environmental education program and the development and utilization of environmental study areas on school sites. Examples of community resources utilized range from sewage treatment plants and vacant lots in the urban environment to natural or wilderness areas in the rural environment. Third, fourth, fifth, and sixth grade students participate in the Maryville College Environmental Education Program, a week-long residence experience jointly sponsored by the National Park Service and Maryville College. Following comprehensive plans prepared in cooperation with the Soil Conservation

Service and the Tennessee Valley Authority, Kingsport teachers and students are developing and using their school campuses for conducting environmental studies. All phases of the program are preceded and followed with related classroom instructional activities and projects.

Curriculum Development

Curriculum materials for utilizing the mobile unit were developed in a summer Curriculum Development Workshop held June-August, 1972. Participants in the workshop included one senior high, two junior high, and two elementary school classroom teachers. The systemwide Environmental Education Coordinator is serving as director for the entire project. Consultant expertise was utilized throughout the workshop.

These curricular materials are directed to all grade levels and integrate all curriculum areas. With the mobile unit serving as the primary resource, investigations were developed which include man's relationship with the natural and man-made surroundings, including the relation of population pressures, pollution, resource allocation and depletion, conservation, technology, and urban and rural planning to the total human environment. Economic, social and political aspects of environmental relationships were considered throughout development.

Evolving from this workshop was a series of 44 student and three teacher in-service environmental education instructional activities. These activities have been combined into a publication entitled Investigations For A Mobile Environmental Education Laboratory.

In-Service Training

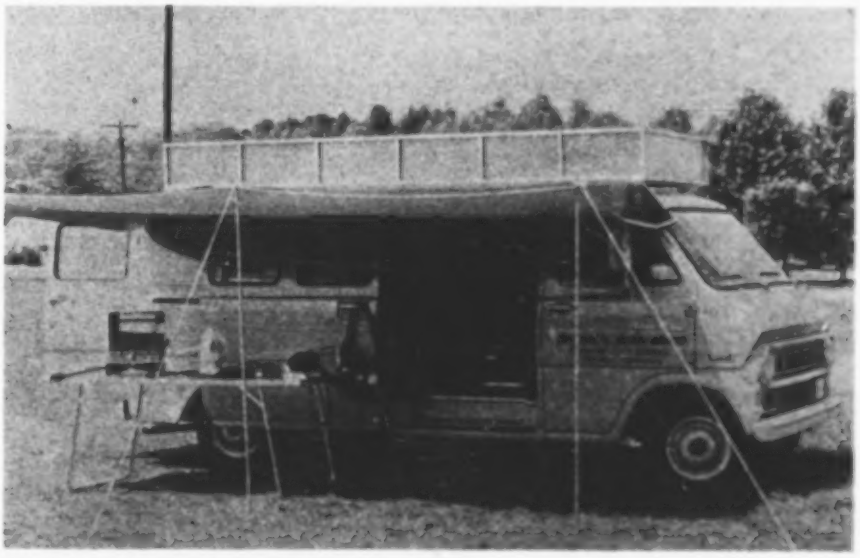
As a part of curriculum development, materials were designed and developed for use in in-service training. These materials are designed for all grade levels and relate to all curriculum areas. The mobile unit and included equipment serve as a basic resource for conducting teacher workshops and in-service training programs on-site at each school or at selected community resource facilities. Before scheduling the use of the unit with a class, the teacher is involved in an in-service program relating to the mobile unit, included equipment, and instructional activities.

The mobile unit, included equipment, and instructional materials are basic resources for conducting in-service training programs and workshops.

MOBILE ENVIRONMENTAL EDUCATION LABORATORY DESIGN

Introduction

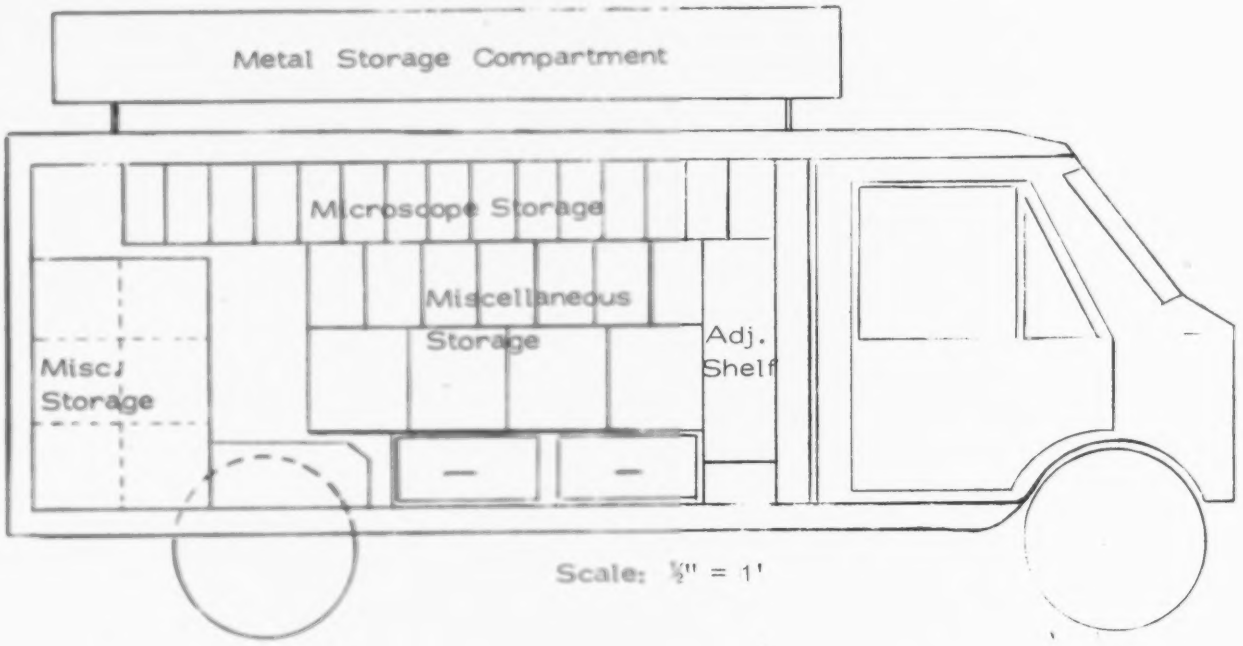
The foundation of the entire project is a one-half ton, 1972, Ford Econoline van which has been designed and equipped with storage facilities for housing environmental study equipment. (See illustrations on the following pages.) The top side of the unit has been equipped with a large metal storage comparment covered with three aluminum hinged water-tight doors as cover for stored equipment. A roll out canvas canopy which protects students and equipment during periods of inclement weather is attached to the curbside of the storage compartment. (See photograph below.) Special safety features include extra suspension and the addition of a protective metal screen between the driver and the storage area.



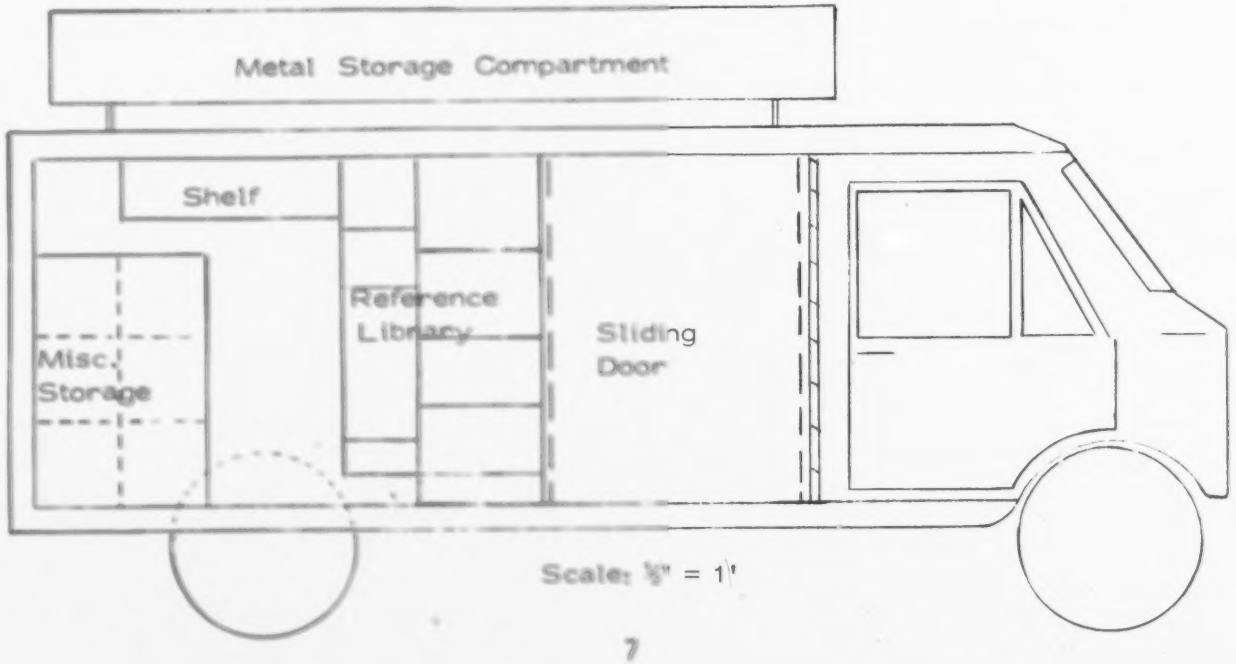
Especially designed and equipped with storage facilities for housing environmental study equipment, the mobile unit adds new dimensions to the total program.

MOBILE ENVIRONMENTAL EDUCATION LABORATORY

ROADSIDE VIEW

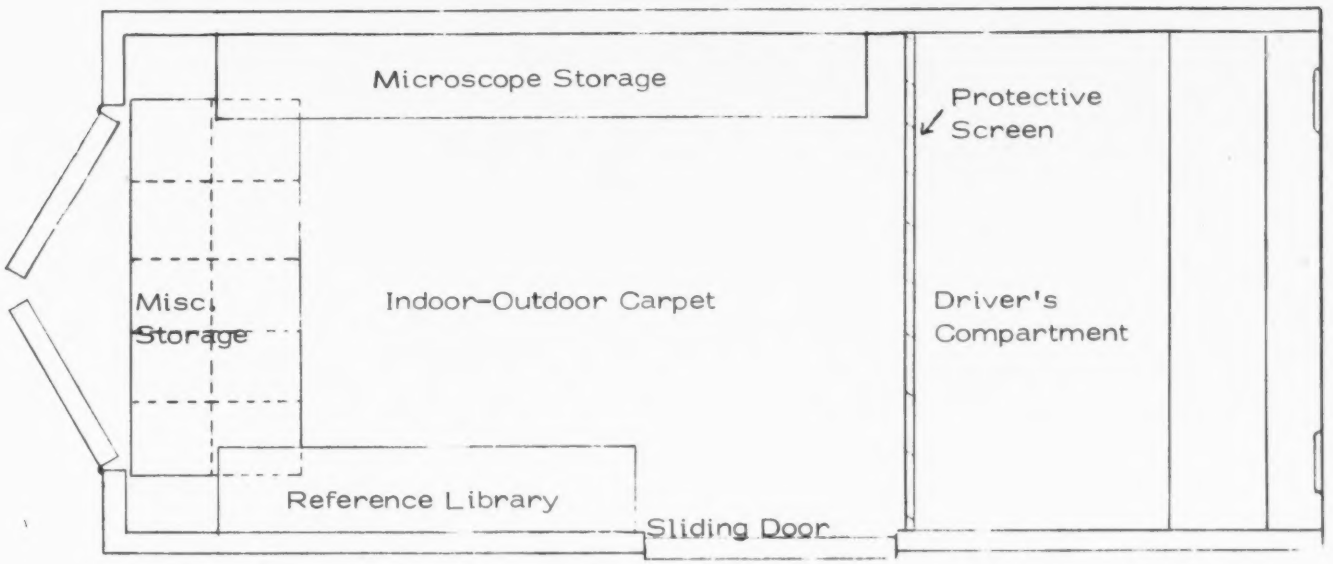


CURBSIDE VIEW



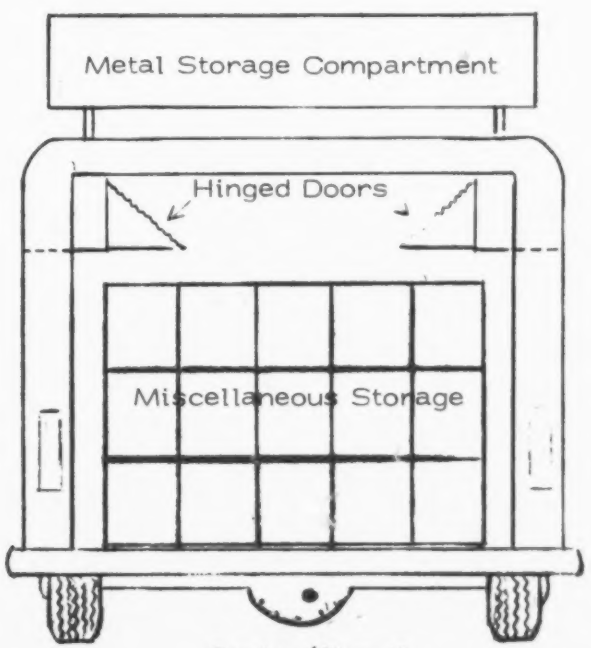
MOBILE ENVIRONMENTAL EDUCATION LABORATORY

TOP VIEW



Scale: ½" = 1'

REAR VIEW



Scale: ½" = 1'

MATERIALS AND EQUIPMENT

Introduction

Equipment and materials included with the mobile unit are divided into five categories:

a. Laboratory Apparatus
b. Tools and Related Equipment
c. Reagents
d. Miscellaneous and Special Equipment
e. Environmentally and Ecologically Related Equipment

A part of the mobile unit equipment includes a reference library stocked with materials and publications relevant to conducting environmental studies. Included are selections from the Peterson Field Guide Series, the Golden Nature Series, and related ecological publications. Additional materials include books, pamphlets and reference materials dealing with environmental problems and various environmental education programs.

Materials and Equipment List

a. Tools and Related Equipment

Tape--Rule (10' and 100')
Mattocks
Budding and Grafting Knife
Pruning Shears
Field Trowels
Collecting Spades
Collecting Tools

b. Miscellaneous and Special Equipment

Tape Recorder
Camera
Film
Folding Tables, Aluminum
Metal Easel
Chalk, Assorted Colors
Clip Boards
Slide Projector

c. Laboratory Apparatus

Microscopes
Microscope Slides
Slide Cover Slips, Acetate and Glass
Stop Watch
Cotton Twine
Rope
Funnels, Polyethylene
Pipettes, Polyethylene
Test Tubes
Medicine Droppers
Test Tube Rack
Plastic Trays

Laboratory Apparatus (continued)

Laboratory Aprons
Finger Bowls
Plastic Dishes
Dispensing Carbow
Beakers, Polyethylene
Meter Sticks
Triple-Beam Balance
Ph Paper
Stoppers, Assorted Rubber
Storage Bottles, Polyethylene
Fire Extinguisher

d. Environmentally and Ecologically Related Equipment

Insect Pins
Insect Killing Bottle
Air Pollution Tester
Canvas Side Sacks
Stream Thermometers
Dissecting Pins
Polyethylene Pails
Soil Thermometers
Limnological Testing Equipment (Natural Systems)
Pocket Field Magnifiers
Soil Testing Equipment
Animal Traps (Various Sizes)
Insect Nets
Insect Spreading Boards
Water Pollution Detection Kit
Water Sampling Bottle
Sounding Lead and Calibrated Line
Bottom Sampling Dredge
Secchi Disk
Plankton Net
Forel-Ule Color Scale
Water Testing Thermometers
Binoculars
Berlese Apparatus
Magnetic Compass
Collecting Jars, Polyethylene
Animal Cages (Various Sizes)
Dissecting Sets
Geology Picks
Soil Auger
Plant Press
Ecology Collecting Sack
Vasculum
Ringleman Charts
Increment Borer
Biltmore Cruiser Sticks
Tree and Log Scales
Noise Detection Equipment

e. Reagents

Ethyl-Alcohol
Formaldehyde
Chloroform

The mobile unit provides equipment previously unavailable for conducting environmental studies.

PROJECT COST ANALYSIS

Introduction

The primary source of funding for the planning, development and implementation of the mobile environmental education laboratory was the Tennessee Valley Authority. Since it was a cooperative demonstration project, additional contributions were made by the Kingsport City School System. On the following page is an analysis of total project costs. No effort is made to itemize contributions by the cooperating school system, however, these contributions included the salary of the Project Director, office space, clerical help, and miscellaneous operating costs for the project.

Cost Analysis

Total Project Costs can be categorized as follows:

A. T.V.A. Funding			
1. Materials and Equipment			
Purchase of 1972 Ford Econoline Van	$2,700.00		
Design and Construction of Van Storage Facilities	2,500.00		
Environmental Study Materials and Equipment for Stocking Van	5,000.00		
Total Materials and Equipment		$10,200.00	
2. Administrative and Clerical Costs			
Curriculum Materials Development Workshop	$2,100.00		
Total Administrative and Clerical		$ 2,100.00	
3. Instructional and Program Costs			
Workshop Participants	$4,700.00		
Consultants	1,500.00		
Total Instructional and Program		$ 6,200.00	
4. Supplies, Reproduction and Communication	$1,000.00		
Total Supplies, Reproduction and Communication		$ 1,000.00	
TOTAL T.V.A. FUNDING			$19,500.00
B. TOTAL KINGSPORT CITY SCHOOLS CONTRIBUTIONS			$10,000.00
C. TOTAL PROJECT COSTS			$29,500.00

SUMMARY

The utilization of the mobile environmental education laboratory for environmental studies is a unique and worthwhile approach for a school system. Considering the many educational benefits, the cost of such a project is very practical. This approach has broad implications for environmental education on a county, regional, or state level. Anyone interested in asking specific questions about this project or in receiving additional information should contact:

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(615) 245-3155